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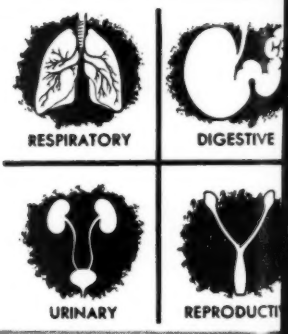

INDICATIONS:

- urethral calculi and bladder sphincter spasms.
- obstetrical complications as in pre and post parturient straining or prolapsing and in cervical spasm.
- vomition control as in nephritis or poisoning.
- anal prolapse.
- coughing spasms as in kennel cough.

- spasms of ureter, bladder sphincter and urethra.

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1. Jones, S. V.; Belloff, G. B., and Roberts, H. D. B.: Vet. Med. 51:413 (Sept.) 1956.

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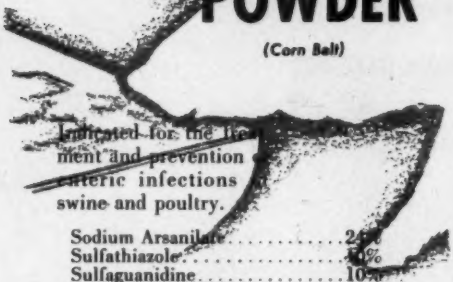

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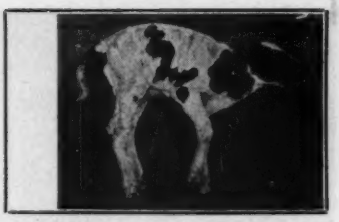

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VETERINARY MEDICINE

March 1960

Volume 55 Number 3

V

NEWS COMMENT

Alcohol Additive

A recently developed feed supplement has ethyl alcohol as one of its major components. Tests of this additive indicate that the alcohol speeds rumen fermentation and the rate of cellulose digestion. Consequently, cattle and sheep are better able to utilize the grain and roughage eaten. Animals fed on this supplement should reach markets more quickly and in much higher quality. At the packing plant, animals fed alcohol fortified supplements should grade out higher, have better flavor.—The Hoosier Farmer

Hormones for Fish

Injections of hormones have speeded spawning in female fish by days or weeks, according to University of Oklahoma workers. A hormone from pregnant women and a pituitary gland extract from unrelated fish species have been used successfully in experiments.

Drug Talk

Senator Kefauver's investigating committee is out to prove that the prescription drug houses get together in violation of the law to set prices on their products and engage in illegal marketing practices, such as discriminatory discounts. Efforts will be made to show that the industry operates at an abnormally high rate of profits. Hearings slated thus far will run well into 1960.

Trace Minerals Safe

A Food and Drug Administration proposal that 37 compounds serving as the source of minerals in animal feeds should be generally recognized as safe was announced recently. The action is a further move to comply with provisions of the Food Additives Amendment, which covers substances added to animal feeds as well as those for human foods.

The agency has listed the minerals, with

limits on amounts to be used, for consideration by qualified experts throughout the country. Included in the proposal are compounds which are the sources of cobalt, copper, iodine, iron, manganese and zinc. FDA recognizes the practice of adding mineral salts to feed mixtures for swine, cattle, poultry and sheep. It has been demonstrated, however, that harmful effects can result from feeding excessive amounts of these compounds. Limitations on amounts to be used in feeds are intended to define safe levels for the total ration to prevent harm to animals.

Keogh-Simpson

Action is likely on the Keogh-Simpson bill to allow doctors and other self-employed persons to set up retirement plans and pay taxes on money so used only when received in the form of annuities. The bill now is before the Senate Finance Committee, whose chairman, Senator Harry F. Byrd (D.Va.) hopes to keep it there. Sponsors of the bill think there are enough votes lined up to pull the bill away from Byrd and onto the floor for a vote. If passed, Ike will probably sign, despite balking.

Coccidiosis in Calves

Fluorescent pigments can be used to trace coccidiosis in calves, according to a recent Modern Medicine report. "The brilliantly colored pigments adhere to coccidia cysts, which show up when lighted with ultraviolet rays . . . The pigments are safer and easier to use than radioactive isotopes."

Brief Radiation

Brief, intense radiation may be more deadly than smaller doses over a long period, according to Dr. I. I. Oster of the Institute for Cancer Research, Philadelphia, and Drs. S. Zimmering and H. J. Muller of Indiana University. In tests conducted on groups of insects (one group received 11 r an hour for two weeks, the other 460,000 r an hour within 31 seconds). Lethal mutations were about three times more common among offspring of the group receiving intense irradiation than among those exposed to chronic radiation for a longer period.

Hypothermia in Cats and Dogs

Hypothermia can be induced in dogs and cats by reducing the temperature of the air breathed to 0 to 3 C. Dr. Frederic H. Litwin of the University of California at Los Angeles reports that inspired air temperature may be lowered to -12 C. without harming animals.--Modern Medicine, November 15, 1959.

V

Here each month are published ideas, suggestions and comments picked up by VM reporters at veterinary meetings.

The Meeting Circuit

Here are notes from the Indiana Veterinary Medical Association Meeting, January 13-15, 1960.

A Permanent Rumen fistula is a practical and sure method for handling chronic bloaters, according to several practitioner reports. I have always wondered why this was not the most logical preventive measure for disastrous pasture bloat. One sage suggests that a further improvement would be to place a whistle in the fistula opening. When the herd starts to whistle in the pasture bottom, farmer Jones could come running and move them to a dry lot before accumulation of more froth. In view of extensive research pursued in connection with this problem, this simple proposal sounds silly but artificial dentures for aged cows sounded silly two years ago and are now achieving practical significance—*C. M. Cooper, D.V.M.*

Use of a Dental Elevator to loosen the wolf teeth of the horse makes extraction much easier.

One Can Break a lot of hypodermic needles trying to vaccinate old sows for erysipelas. Try backing them in a tight spot, grab them by the tail and inject along side the tailhead.

A Regular Hammer type tack puller from the hardware store will flip out the equine wolf tooth with little effort. If it sticks to the gum, use a forceps and pull it all the way out.

To Get a Urine Sample from a mare, attach a rubber bulb to a urinary catheter. When the catheter is in place, squeeze the bulb and you will readily get your sample.

A Methenamine Tablet will burn for two minutes providing a convenient flame for sterilizing inoculation loops or knife blades in the field.

Anemia in Older Pigs is typified by pica, convulsions and death. They root in the straw and in desperation will chew on each other. This is where the tails and ears go and the reason pigs get rooted to death. You will see edema around the eye, a gelatinous ham and fullness of the throatlatch. You have to look closely for these lesions. Occasionally you will see a convulsion and the pig recovers. A history of unexplained sudden deaths is not uncommon. These problems will occur all the way to market weight. If you take your hemoglobinometer and go looking you will be able to put your finger on the trouble. If corrected, deaths will stop. Postmortem findings are extremely variable. Diagnosis is based on history and keen observation. One can often observe a great deal in the hoglot at midnight when they are undisturbed. The hemoglobinometer is extremely valuable for diagnosis. Cut off the end of the tail and get one drop of blood. Any time a pig gets below 9 gm. they are in trouble or going to get in trouble. You like to see them 10 gm. or better.

Management of Self Suckers

Surgical correction of the self sucker cow requires confinement in a stanchion, 2 or 3 cc. of Thorazine or other tranquilizer at comparable dosage. Tie a clothesline rope to the base of the tongue and pull it tight, so the tongue is pulled out the side of the mouth and back along the side of the nose. Inject a triangular or eliptical area under the tongue with procaine hydrochloride solution. Locate this area from the back of the frenum to a point about ¾ in. from the end of the tongue. Peel off the mucous membrane after an eliptical incision has been made and use a mattress suture to pull the edges together. Sutures do not need to be removed, and hemorrhage is not a major problem. The cow will walk away, protrude her tongue a few times but continue to eat as if nothing has happened, that is if the local anesthetic works well. This can be achieved with practically no drop in milk production. — *Charles B. Randall, D.V.M.*

Teat Surgery

A number one problem in teat surgery is restraint of the patient. This problem can be resolved with tranquilizers and local anesthesia. One should avoid excessive doses of tranquilizers and keep the patient standing. A rope around the leg will restrain the patient and keep the operator from being needlessly kicked.

Freshly cut teats should be sutured immediately. A tourniquet around the base of the teat after cleaning with a disinfectant is essential. In closing the teat with a mattress suture, place about ½ to 1 in. back from the edges of the wound, passing immediately above the mucous membrane and out again. Pull the membrane in apposition as smoothly as possible. Mastitis is a problem if you penetrate the mucous membrane. Interrupted or continuous sutures along the cut edge should be used to bring it into position. An exception to this step is when the teat is torn and traumatized. In these cases, use the mattress suture, but do not suture the cut surface. Trim away excess tissue to avoid pockets for infection.

Penicillin is used on the suture line and also in the teat canal. Stitches are left in no longer than ten days. If the wound looks good, the mattress sutures may be removed in several days. If there is any milk in the wound at time of suturing, first intention healing will not occur due to fat.

Old cuts should be scrubbed and cleaned vigorously with ether to stimulate circulation and handled like fresh cuts.

Cuts through the end of the teat are handled in the same manner except that a Larson's plastic teat tube is sutured in place. To avoid mastitis, don't milk for three or four days. If the cow is a heavy milker some type of tube will be needed to relieve pressure.

In dealing with the mashed and necrotic teat end, cut back until you locate healthy tissue and cut it off. You can't make it any worse. In cases of gangrenous mastitis, try slitting the teat instead of cutting it clear off. This reduces troublesome hemorrhage.—*Charles B. Randall, D.V.M.*

Removal of Retained Placenta

Does manual removal of retained placenta have any bearing on milk yield and future fertility? When afterbirth is retained and allowed to decompose without treatment, there is obvious risk of endometritis and salpingitis which may seriously interfere with future pregnancy, if it does not cause more immediate systemic effects with generalized malaise and consequent drop in milk yield.

Danish workers have found that where no systemic disturbance occurs and the placenta is not removed, a drop of 5 lb. in milk yield can be expected about two weeks after parturition.

Routine use of uterine boluses did not appear to influence fertility rate, but probably prevents the drop in milk and reduces the risk of septicemia. Recent studies in this country suggest that routine uterine

medication does improve fertility if the organisms present are susceptible to the medicants.

Radiological Hazards

The radiation level is climbing every day, and is fed from many sources. Some of these sources can be controlled. Gross neglect is a major problem. Barehanded technics when a hand shows on the *x*-ray is unpardonable.

Accidental burning is not simply a problem to older veterinarians not familiar with the hazards, but takes its toll among the younger men as well. Time goes so fast when manipulating under the fluoroscope that one frequently forgets.

A dry, shiny skin is always an indication that you or your associate have received too much radiation. Safety precautions suggest that you anesthetize an animal for *x*-ray. A veterinarian can be sued for damages to his help.

Gross neglect accounts for only a part of the problem. The man who thinks he is taking reasonable precautions, but unknowingly doing himself some harm presents a major problem. Decreased life expectancy of *x*-ray workers without visible burns seems to be a major sign. This syndrome resembles accelerated aging.

How to live with *x*-ray is the challenge. No human being should ever be exposed to the primary beam. Scatter radiation is then the remaining problem but does not have the range. The greatest protection from scatter radiation is distance. For 25 cents you can buy an extension cord on your switch which will let you go around the corner of a cement block wall before you make the exposure. One must still work with the necessary gloves and apron. A very serviceable lead shield can be made for less than $50, and is satisfactory protection for the worker who makes the exposure.

Gloves and apron should be checked periodically. This can be accomplished by taking gloves into a darkroom and placing strips of film down into the fingers. Sealed gloves can then be exposed to the *x*-ray machine on both sides. Development will reveal any leaks. This precautionary procedure should be accomplished at least once a year.

The fluoroscope has no place in veterinary practice. If, however, you have one, be sure the special leadglass screen is in good shape or has not been replaced by plain glass. Check the head of the machine. Dental films taped to the head of the machine will reveal any flaws in the protection head. These films should be checked by development every two weeks. Even a new machine can leak.

Adaptation of the eyes to darkness for 15 minutes helps to see in a hurry and increases safety. Although redundant, it is necessary to caution every veterinarian to take his foot off the switch while thinking. Badge service as supplied hospitals is a valuable aid in checking radiation. Badges must be worn outside the apron where radiation can be detected. They certainly are no good if left at home on the kitchen table.—*J. J. Fishler, D.V.M., 76th annual meeting of the Indiana Veterinary Medical Association.*

Virus Linked to Leukemia

New evidence linking a virus with mammalian leukemia has been reported by *Medical News,* (November 25, 1959.) University of Naples researchers have demonstrated the viral etiology in a calf which died at the age of 45 days of acute lymphatic leukemia. Inoculation of material from the calf's lymph nodes caused death in a significant percentage of chick embryos.

To determine whether a viral agent was responsible for these deaths, observation of the influence of cortisone on mortality in chick embryos inoculated with leukemic filtrate, and application of the well known interference phenomenon using leukemic material against influenza virus type B. "At the 50th serial passage, embryos inoculated with cortisone plus leukemic filtrate showed a mortality rate almost six times that of embryos inoculated with the filtrate alone. And treatment of chick embryos with influenza B virus after inoculation with leukemic filtrate clearly demonstrated interference. After 72 hours, influenza B titers of amnion-allantoic fluid from embryos that

Veterinary Calendar

Feb. 28-29. **West Virginia Medical Association,** winter meeting. Greenbriar Hotel, White Sulphur Springs, West Virginia. Harry J. Fallon, 200 Fifth Street West, Huntington, West Virginia, secretary.

Mar. 4. **Indiana Veterinary Medical Association,** third Symposium on Therapeutic Nutrition. Co-sponsored with Vita Vet Laboratories State Board of Health Building, Indianapolis, Indiana. E. E. Slatter, D.V.M., Box 108, Marion, Indiana, chairman.

Mar. 21-22. **Michigan Conference on Comparative Medicine.** Kellogg Center for Continuing Education, Michigan State University, East Lansing, Michigan.

Mar. 29-30. **American Animal Hospital Association, Region 3.** Commodore Perry Hotel, Toledo, Ohio.

Apr. 3-5. **Alabama Veterinary Medical Association,** annual meeting. Battle House, Mobile, Alabama. Dr. M. K. Heath, secretary.

Apr. 19-22. **American Animal Hospital Association,** annual convention. Statler-Hilton Hotel, Boston, Massachusetts. Dr. Frank Booth, 3920 E. Jackson Blvd., Elkhart, Indiana, executive secretary.

Apr. 30-May 1. **Third Annual Florida Conference for Veterinarians,** symposium on Diseases of Young Animals. University of Florida, Gainesville, Florida. W. R. Pritchard, head, Department of Veterinary Science, University of Florida, Gainesville, correspondent.

May 19-21. **Kansas State University,** 22nd annual Conference for Kansas Veterinarians. School of Veterinary Medicine, Kansas State University, Manhattan, Kansas. M. W. Osburn, D.V.M., extension veterinarian.

Jun. 2-3. **Texas Conference of Veterinarians,** 13th annual meeting. School of Veterinary Medicine, College Station, Texas. Dr. R. D. Turk, conference chairman.

Jun. 20-22. **North Carolina State Veterinary Examining Board,** examinations for a license in North Carolina. Grove Park Inn, Asheville, North Carolina. Dr. James I. Cornwell, P. O. Box 9038, Asheville, secretary-treasurer.

Jun. 23-24. **Maryland State Veterinary Medical Association,** summer meeting. George Washington Hotel, Ocean City, Maryland. Dr. Harry L. Schultz, Jr., secretary.

Jun. 27-29. **California Veterinary Medical Association,** 72nd annual convention. Jack Tar Hotel, San Francisco. Ken Humphreys, 3004 16th Street, Rooms 301-2, San Francisco 3, California, executive secretary.

Jul. 17-19. **Virginia Veterinary Medical Association,** summer meeting. Shoreham Hotel, Washington, D. C. Dr. G. B. Estes, State Office Building, Richmond Virginia, secretary-treasurer.

had received both inoculations averaged 1:160, whereas titers in embryos inoculated with flu virus alone averaged 1:1,186."

Equine Practitioners Meet

The American Association of Equine Practitioners held its annual convention in Chicago, December 14-16. A record attendance of 202 veterinarians attended the professional program which covered all phases of the equine industry—ponies, pleasure horses, racing, rodeo, all breeds and all sports. While the total equine population is at a new low—a little over three million—the total dollar value of horses is at an all-time high. This means more good horses demanding better veterinary attention.

Infectious anemia (swamp fever) is still quite prevalent in some areas of the United States. Nothing is being done to curtail or control it. In nature it is probably spread by biting insects. However, at race tracks the biggest threat and means of spread is through the use of hypodermic needles by unqualified persons. The infection can be readily transmitted from horse to horse on unsterilized needles.

Deplored also was the general misunderstanding about equine encephalomyelitis. It was related that an outbreak on the east coast last summer resulted in mass hysteria ruinous to racetracks and summer resorts. Emphasized was the fact that both man and horse are an accidental dead-end host for this virus. Actually, the disease is one of small wild birds. Mosquitos spread the disease from bird to bird, also from bird to man and horse but never from horse to horse or horse to man.

Equine surgery and *x*-ray received considerable attention. More and more orthopedic surgery is being done each year. Many practitioners now resort to abdominal surgery in handling certain types of colic cases. Suggested was a plan whereby horses suffering fractured bones would be turned over to a veterinary research and teaching agency for treatment rather than being destroyed as is currently the practice. A committee was appointed to work with insurance and research interests.

LICENSED ASSISTANTS IN VETERINARY PRACTICE

SPEAKING before The International Veterinary Congress in Madrid last summer, Professor Dr. Jac. Jansen, of the Netherlands commented that a survey of the various phases of veterinary science and practice reveals that the difficulty of the many activities involved differs greatly. To examine a patient requires great skill and knowledge. The veterinarian has to make a diagnosis and select proper therapeutic measures. The simple and harmless application of many killed or inactivated vaccines serves as a contrast.

Doctor Jansen went on to point out that history has shown that veterinary science and practice have to be exercised by trained, licensed veterinarians; but it appears that non-licensed persons are inclined to work in various fields of veterinary practice. The division of tasks between licensed veterinarians and non-qualified persons is not clear and varies greatly in different countries. Professor Jansen proposed a study of the problem on an international plane to afford greater uniformity and protect the scientific level of the profession. He raises the question: Wouldn't it be desirable to have all trained, licensed assistants under the strict supervision of qualified veterinarians?

This rather formal discussion from across the ocean sounds a little theoretical and lofty to the American practitioner faced with the hard, cold reality of lay competition, and the hiring of competent employees, but it is interesting to know that this country does not have a corner on the problem.

In past years such a suggestion would have been met with cries of heresy. Fear of training a pool of lay quacks would have been loudly voiced. Based on earlier experiences, this position was not entirely without grounds, since lay help around the typical equine practice of 50 years ago frequently did move down the road and become the county quack.

This proposal does not suggest the indiscriminate employment of more laymen in veterinary practices. In fact, quite the opposite is involved when we propose

strict definition of the duties lay persons might perform and strict regulation through licensing.

In the past few years the increasing role of the large animal veterinarian as consultant, diagnostician and surgeon has pointed out all too plainly that the public wants and is willing to pay a professional fee for a professional service, but is not willing to pay a professional fee for routine mass production procedures. The veterinarian is faced with the decision of trying to do any and all chores at inadequate fees or giving up to the "do it yourself" influence and hope that he can still keep some control by dispensing competitively with the local druggist or feed store.

The operator of the small animal hospital views the problem of lay help from a different but equally perplexing position. He has had to find his skilled technicians from the medical field or any place he could find them.

With a little orientation, these people trained by the medical profession fit well into the small animal hospital routine. Nevertheless, most hospitals find the problems of properly training lay help a time-consuming and bothersome procedure.

Serious study of the merits and problems of officially licensed lay personnel can not initiate spontaneous endorsement. To establish standards and institute proper legal control would pose knotty problems. The problems of licensing and control are equaled by the problems of establishing facilities and a curriculum for formal training of such persons. Our veterinary schools or some approved centers of training would face new problems of financing and facilities to serve an entirely new field of training.

In contrast to the many problems involved, the vision of being able to render all phases of veterinary service more efficiently offers some intriguing long-range possibilities. With a core of organized professionally trained veterinarians surrounded by well trained and supervised help, the profession would present an imposing barrier to the veterinary drug huckster. With our own house in order for efficient, complete service, we would be sufficiently strong to demand legally that all purveyors and promoters of animal health services and products be licensed and supervised by veterinarians.

These are just a few of the ramifications of an interesting but complex proposal. You are the only valid source of information on what's right for the veterinary profession. What do you, the practicing veterinarian, think? Jot down your thoughts and send them to the editor for publication in VETERINARY MEDICINE.

Urea in the Ration

Urea as an aid to a low-protein ration is of value, but it has no energy value and does not increase milk production when the ration is otherwise an adequate one. When the ration is a low-protein one, it does not result in high milk yields, immaterial of the source of the protein. Putting it otherwise, if the plant food ration is adequate in its nitrogen content, the addition of urea is without value.

One of the early criticisms raised against urea was that lumpy urea caused a toxic condition when poorly mixed with the ration. With present mixing processes, this objection has been removed. Research has demonstrated no value of urea for either hogs or poultry. If protein feeds are in short supply, the addition of urea to a low protein ration is of demonstrated economic value.—*R. R. Dykstra, D.V.M.*

ICHTHYOSIS CONGENITA IN CATTLE

R. J. JULIAN, D.V.M.
Ontario Veterinary College
Regional Veterinary Laboratory
Kemptville, Ontario

Ichthyosis, an inherited abnormality of the skin, has occasionally been described in cattle. The type described is *Ichthyosis foetalis.* A very similar condition also occurs in man. Smith and Jones[3] describe the condition in the following terms. "The skin of the affected newborn infant and calf are strikingly similar; neither survive more than a few hours or days. The entire skin is hairless and is covered with thick, scaly, horny epidermis which is divided into plates by deep fissures. These fissures are often wide, with a red, raw-appearing base, and follow a pattern that corresponds to the cleavage planes of the skin. The skin is everted around the lips, eyes and other body orifices, giving the impression of being too small for the body which it encases." These authors also state that other types of congenital and adult ichthyosis are known in man but apparently have not been recognized in animals.

This case report describes another type of congenital ichthyosis which occurred in Ontario. The animals in this herd were mostly grade Holsteins.

History of Cases

Ichthyosis first appeared in 1955 but the herd was not seen by the author until the following year, by which time ten ichthyotic calves had been born and killed, or disposed of for veal. Since this was a grade herd, few records were kept, but the following story was pieced together.

In 1951 the owner purchased a purebred bull calf (bull B). The bull was used for service when about a year old and continued as the herd sire for two years. Bull B sired seven heifer calves (1 to 7) in his first year of service and nine heifers (8 to 16) in his second year of service, plus an undetermined number of bull calves each year. These calves were all normal. A bull calf, (C.B.) son of bull B dropped early in 1953 by cow X, was raised and became the next herd sire. C.B. served all the females in the herd for the next two years. The first calves from him were born in the spring of 1955. That fall his half sisters (1 to 7) born two years previously, calved. All were bred by C.B. except no. 7, a registered animal which was bred by a registered bull, N.

According to the owner, all these cows except no. 7 dropped ichthyotic bull calves (table 1). The following year these animals (except two which had been sold), as well as bull B's second crop of heifers (8 to 16) calves calved. Six of these (8 to 13) pasture bred by an unknown

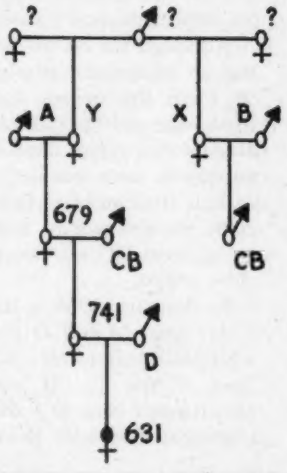


Fig. 1. Pedigree of abnormal calf 631. Bull A, herd sire 1950, 51. Cow X and Y half sisters bought by herd owner.

bull P, and no. 7 bred by bull N, had normal calves. The remaining seven heifers were bred by C.B. Five of the seven had ichthyotic bull calves, the other two had normal heifer calves. All the other cows in the herd were bred by C.B. both years, and all dropped normal calves. C.B. was sold following his second year of service.

In 1956 another purebred bull (D) became the herd sire. The eleven remaining daughters of sire B (three more had been sold) when bred to bull D produced four ichthyotic bull calves, and eight normal bull and heifer calves. One cow gave birth to twins, a normal heifer and an ichthyotic bull (table 1).

Although no record had been kept of the sex of the abnormal calves until late in 1956, the owner was sure that all ichthyotic calves had been males. Also any normal calves sired by C.B. from B daughters were females. The daughters of bull B when bred to bull D produced some normal calves, both male and female; however, all the abnormal calves were males.

In January 1958 a daughter of C.B. (741) bred to bull D produced the first ichthyotic heifer calf (631) born in this herd (figure 1). It was also the first affected calf born to a cow which was not a daughter of bull B. As can be seen from the chart, 741 was not only a daughter of C.B. but also a second cousin through his dam. Since the birth of calf 631 there have been no affected calves born in this herd. All of bull B's daughters except no. 7 have been sold. Bull D was disposed of following his second year of service.

The owner claimed that when the condition first appeared the ichthyosis was more serious than in the later calvings. His description of these first calves is as follows: "They were of normal size and weight at birth. The hair was short and bristly with no hair around the muzzle, eyes and in the joint areas. The hide was hard and thick like old leather and was in folds along the neck, belly and at the joints. Cracks soon appeared in the joint areas and around the muzzle and ears and fluid oozed through the cracks. Most of the calves were either killed or sold for veal. Only one died, presumably of exposure."

Calves born later, and which were observed by the writer, were able to stand

Fig. 3. Calf 3910 at two weeks of age. Note distribution and appearance of lesions on ventral surface.

Fig. 2. Calf 3910 at two weeks of age. Note tucked up appearance and unpliable, cracked and folded skin.

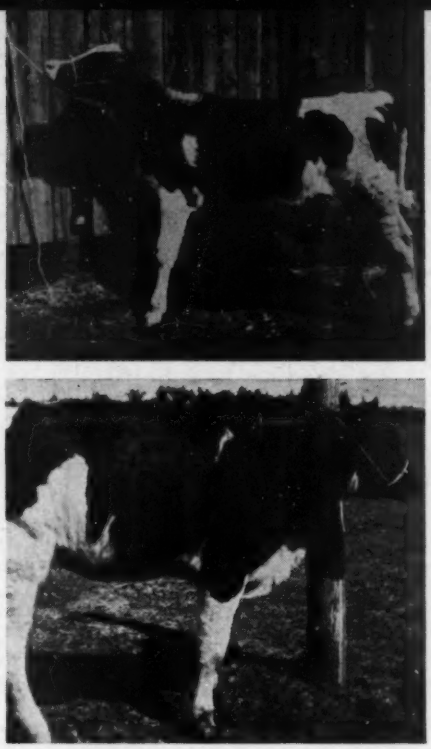


Fig. 4. Heifer 631 at four (top) and five (bottom) months of age. There is loss of hair and thick, scurfy, wrinkled skin.

in a day or two. Their skin did not appear to be so seriously affected as those cases described by the owner.

Calf 3910 was kept about three weeks (figures 2, 3) before being destroyed for autopsy. Calf 1235 sired by bull D, did not appear less severely affected than 3910, sired by C.B. When calf 1235 was removed from the herd it suffered from scours and died at one week of age. The ichthyotic heifer 631 sired by bull D appeared more normal at birth. Signs of ichthyosis were only evident on close examination or when a fold of skin was palpated. As the animal became older the skin over much of her body became similar to that seen in bovine hyperkeratosis.

Alopecia and ichthyosis became progressively more evident, particularly in the cervical region, (figure 4) during a period of four months, but when the animal was put on pasture the horny layer on the surface of the skin began to rub off in places and was replaced by skin with a more normal texture and ap-

TABLE 1. Daughters of Bull B (1-16)

	1955			1956			1957		
	Bred to:	Ichthyosis	Sex	Bred to:	Ichthyosis	Sex	Bred to:	Ichthyosis	Sex
1.	C.B.	+	M?	C.B.	+	M?	D	+	M
2.	C.B.	+	M?	C.B.	+	M?	D(twins)	+ —	M F
3.	C.B.	+	M?	C.B.	+	M?	sold		
4.	C.B.	+	M?	C.B.	+	M?	sold		
5.	C.B.	+	M?	sold					
6.	C.B.	+	M?	sold					
7.	N	—	M	N	—	F	D	—	M
8.				P	—	M	D	+(1235)	M
9.				P	—	M	D	—	M
10.				P	—	F	sold		
11.				P	—	M	D	—	M
12.				P	—	F	D	—	M
13.				P	—	F	D	—	F
14.				C.B.	—	F	D	—	M
15.				C.B.	+	M(3910)	D	+	M
16.				C.B.	—	F	D	—	M

Results of breeding of daughters of bull B: B, herd sire 1952-53; C.B., son of B—herd sire 1954-55; D, herd sire 1956-57; N, neighbor's bull; P, unknown bull.

pearance (figure 5). During the winter the thickened folded skin became more evident again (figure 6). The animal seemed to be hypersensitive to cold. During the spring of her second year she had difficulty rising and seemed unsteady on her hind legs. She also passed small quantities of urine frequently. When she was just over 16 months old she fell down on her side in a manger, bloated and died. Figure 7 shows a close-up view and a cross section of the skin of this calf.

Histological Examination of the Skin

Microscopic examination revealed the following changes in the skin of calves 3910, 1235, and 631 (figures 8, 9, 10).

"Skin — There is excessive keratinization. The underlying transitional cells are increased in numbers while the prickle cell layer is diminished. The increased keratinization continues down into the hair follicles resulting in separation of the shaft from the walls of the follicle, by layers of keratin. The surface of the *stratum corneum* presents numerous wrinkles and folds. The depths of the folds have become denuded of epithelium — cracked due to decreased pliability of the skin, and secondary infection has resulted.

"Blood vessels and lymphatics of the papillary layer of the derma are dilated, resembling hemangioma in some areas. There is also severe edema and some round cell infiltration in this layer *(angio keratomatosis)*."

Other than the changes in the skin no lesions were found in these calves, although a careful macroscopic and microscopic examination of all organs was made at the Ontario Veterinary College.

Discussion

We have been able to trace a relationship between bulls B and D, the last two registered bulls used in this herd. B's sire and bull D, came from the same purebred herd and the grandsire of B was the great grandsire of D. Other

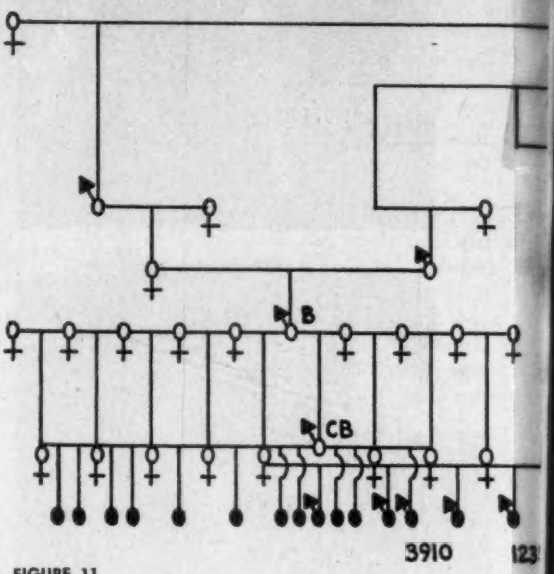
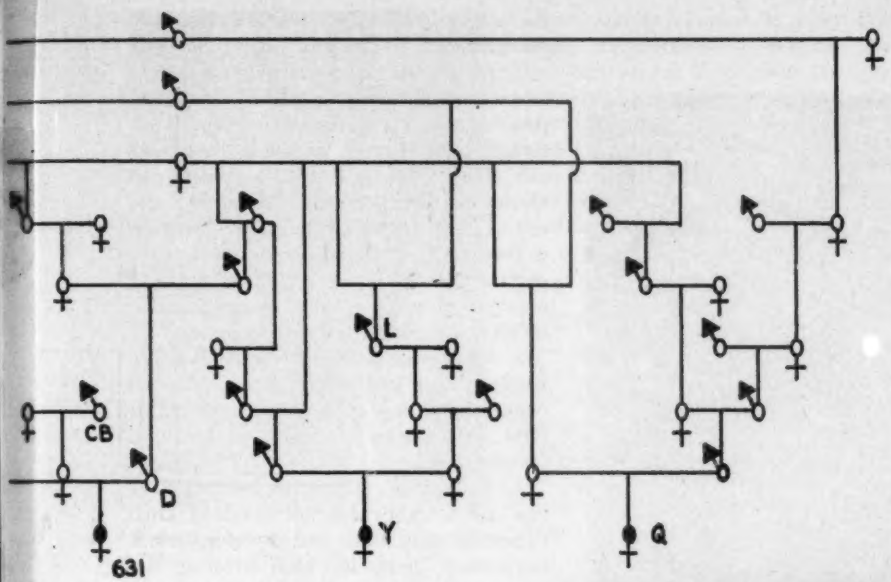


FIGURE 11.

calves similarly affected have been reported in the same part of Ontario. Two of them were females. They have been designated Y and Q and are related in more than one way to both bull B and bull D as shown in figure 11. Q is still living and is five months old. She would appear to be more severely affected than 631.

Fig. 5. Heifer 631 at eight months of age, while on pasture. Skin and hair coat somewhat improved.



Cockayne[1] in his book on inherited abnormalities of the skin makes use of differences in severity, age at time of appearance, and location and distribution of lesions as a criterion for classification of ichthyosis in man. On this basis he has described the following types of ichthyosis as being less severe than *ichthyosis*

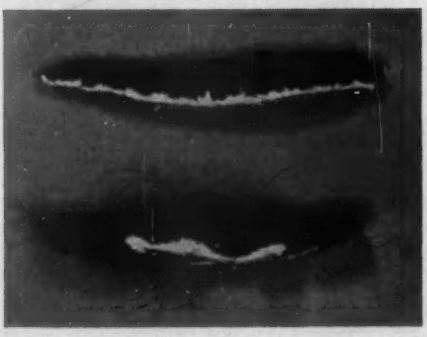


Fig. 7. Above: Skin of calf 631, from just above the point of the shoulder, showing folds, cracks, excessive keratinization and loss of hair; below: skin of calf 631, but in cross section to show thickness. A folded section from the neck and a smoother section from behind the shoulder.

Fig. 6. Heifer 631 at 14 months of age. Note marked ichthyosis. This is particularly evident where the shoulder has been rubbed by the stanchion.

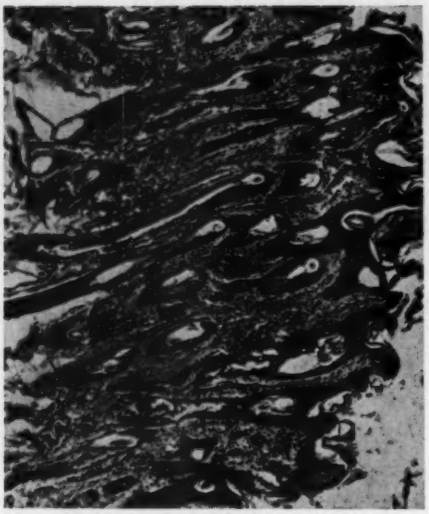


Fig. 8. Microphotographs of skin from shoulder of calf 631. Note wrinkling, hyperplasia, hypertrophy and round cell infiltration. (X80).

Fig. 9. Excessive keratinization with stratum granulosum minimal or absent (X80).

foetalis, which is the most serious form recognized.

1. *Ichthyosis congenita* may vary from severe cases which resemble *ichthyosis foetalis* and where the entire skin is affected, to mild cases in which the lesions are chiefly confined to the chest and abdomen. The skin of the flexures is the site of greatest thickening. The condition is present at birth and does not usually result in death. It is believed to be due to a single autosomal recessive gene. The incidence is slightly higher in males.

2. *Ichthyosis erythroderma* is also congenital but is less severe than *ichthyosis congenita*. The skin is abnormally red at birth, with thickening and hyperkeratosis occurring later.

3. *Ichthyosis vulgaris* is described as less severe again and not manifest until sometime after birth and therefore is not congenital. Here the skin covering the knees and elbows is more severely affected than elsewhere.

These, as well as other varied and less severe types of ichthyosis which are described by Cockayne[1] are considered to be caused by inherited defects.

Because of the similarity of *ichthyosis congenita* in humans the condition described here in calves has been called *'ichthyosis congenita'*. An extensive search through the literature revealed that no skin condition of this type has previously been reported in cattle. Smith and Jones[2] have stated that only one form of congenital ichthyosis, which leads to death in a few hours or days, has been reported in calves. Tuff and Gleditsch[4] describe what they call *'ichthyosis congenita'* due to a single autosomal recessive sublethal gene in nine related Red Poll calves; these calves died shortly after birth. The description of the skin of these calves would indicate that they were much more seriously affected than those reported here and were probably cases of *ichthyosis foetalis*. Dunlop[3] described two cases of *'congenital hypertrophic keratinizing dermatosis'* in a purebred Brown Swiss herd. The description resembles the cases reported by Jones and Smith[2] and would also appear to be *ichthyosis foetalis*.

Fig. 10. Sebaceous glands tend to be hyperplastic, a characteristic of ichthyosis congenita (X240).

Summary

An ichthyotic condition in calves in Ontario has been described. It would not appear to be *ichthyosis foetalis*, which occurs both in cattle and in man and which results in death in a few hours or days. If Cockayne's[1] human standard can be used for the bovine, the condition reported here which is present at birth, but does not necessarily result in death, can be called *'ichthyosis congenita'*. It would appear that this particular type of ichthyosis has not previously been reported in cattle.

Acknowledgments

The author wishes to thank Dr. J. A. Henderson, Head of the Department of Medicine and Surgery; Dr. D. L. T. Smith, Head of the Department of Pathology and Bacteriology; and Dr. J. P. W. Gilman, Head of the Division of Biology; of the Ontario Veterinary College for their advice and direction in the preparation of this material.

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Radiation of Food

Irradiation penetration of foods such as meat, eggs, etc., may have some drawbacks, according to recent developments. Preservation of foods so treated destroys putrefactive organisms, thus spoilage due to lack of refrigeration is prevented for relatively long periods.

Human beings consuming irradiated foods for short periods have suffered no apparent ill effects in tests to date. At this time it is impossible to state whether there would be ill effects if human beings consumed irradiated foods over prolonged periods.

On the other hand, research animals—dogs, rats and mice—maintained on diets of irradiated foods for long periods developed some alarming symptoms. Bitches had smaller than normal litters. Rats exhibited eye conditions or bled and sometimes died prematurely. Mice exhibited enlarged cardiac auricles resulting in difficult breathing and sometimes cardiac rupture. Since the irradiated foods are not radioactive, a hypothetical explanation is that the irradiation destroyed natural vitamins such as biotin, riboflavin, etc.

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CLINICAL USE OF SUCCINYLCHOLINE CHLORIDE IN THE HORSE

THE PHARMACOLOGY of succinylcholine chloride has been adequately described[1,2,4] and the clinical applications have also been outlined.[1,3] Essentially, the drug produces muscular paralysis by depolarization of the motor end plates of skeletal muscle. Because the diaphragm is also paralyzed, recommendations have been made that a means of artificial respiration should be available when the drug is used.

Experimental and clinical use of succinylcholine chloride administered intravenously in more than 500 horses has indicated that the margin of safety in this species is much greater than previously reported. In no instance was artificial respiration necessary. Intramuscular administration has not been used because of the much larger dose that must be employed to produce muscular paralysis.[1] Further complications resulting from this method of administration include difficulty in regulating the duration of the paralysis, and accompanying respiratory embarrassment due to erratic absorption rates.

Rapid intravenous injection of succinylcholine chloride in sufficient quantity produces paralysis of all voluntary muscles. The animal usually buckles at the carpus and tarsus, falling in lateral recumbency or on the sternum, remaining quiet for approximately two minutes. A minimum of mechanical restraint is needed during this period, and short surgical procedures — especially simple castrations — may easily be performed. The animal will ordinarily regain its feet promptly at the end of the period with little urging.

Experimental use of the drug in a concentration of 20 mg./cc. (available commercially as Sucostrin Chloride—Squibb) indicated that the safety margin with intravenous administration was fairly wide, and that clinical use for short surgical procedures and restraint would be feasible. One grade mare, 12 years old, weighing approximately 1,100 lb., was given repeated intravenous doses of 50 mg. at ten minute intervals for a total of five doses. Each time the animal behaved in the same manner. Approximately 20 seconds after administration, the animal tossed its head, the nictitating membranes protruded, then the animal buckled at the carpus and tarsus and fell to the ground on its sternum. Several spasmodic muscular motions were noted before the animal lay quietly. It remained quiet for 2½ to 3 minutes, then regained its feet with no struggling nor incoordination. Respirations were noted to stop for about one minute after the animal first fell to the ground, then to begin with several diaphragmatic movements, followed by shallow respiratory movements that gradually became deeper and more normal. By the time the animal had regained its feet, respirations were essentially normal. No adverse effects were noted from repeated injections.

Case Reports

Two animals were to be destroyed, and an attempt to do this was made using intravenous injections of succinylcholine chloride. One animal was nine months of age, weighing approximately 600 lb. Succinylcholine chloride (180 mg.) was injected intravenously as rapidly as possible through a 14 gauge hypodermic needle. Within 20 seconds, the nictitating membrane protruded, then in rapid succession the animal buckled at the carpus and tarsus and fell in lateral recumbency. Respirations stopped completely for 3½ minutes, then began again with very shallow diaphragmatic movements. The respirations gradually became more normal, and the animal regained its feet in about ten minutes.

The second animal was an aged pony weighing about 650 lb. Succinylcholine chloride (220 mg) was injected very rapidly through a 16 gauge hypodermic needle. Essentially the same syndrome was noted. Both animals appeared to be normal 15 minutes after regaining their feet.

Further experimentation resulted in a fairly standardized dose that produced muscular paralysis lasting 1½ to 2½ minutes, with respirations ceasing for not over one minute. The average dose used has been 20 mg./500 lb. body weight. The maximum dose should not exceed 50 mg. in light horses. Draft animals have required up to 80 mg. to produce desired muscular paralysis. It has been noted that smaller animals (Shetland ponies) seem to require a slightly larger dose in proportion to their weight than do larger animals.

The drug has been used chiefly for simple castrations in the horse, although it has also been employed for other short surgical procedures such as draining and injection of bursae and joint cavities, extraction of deciduous teeth, and short "firing" procedures. The usual method of restraint for simple castrations when succinylcholine chloride is used, is to apply a sideline to the right hind leg and inject the drug intravenously. When the animal collapses, the right leg is drawn up out of the way of the operator. As soon as the emasculator is removed from the spermatic cords, the sideline is released, and the animal is free to regain its feet.

Fractional Doses

In case additional time is required to complete the operation, fractional doses may be administered (usually ½ the original dose) when respirations are established. These may be repeated several times if necessary with no apparent adverse effects. It has been observed that respiratory movements may be stimulated if the tongue is pulled in and out of the mouth. In case the original dose was too small to produce paralysis, or if it was thought that a portion of the drug was

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DISEASES OF BABY PIGS

PART III. DISEASES MANIFEST BY NERVOUS SYSTEM INVOLVEMENT
DISEASES MANIFEST BY RESPIRATORY INVOLVEMENT

by C. L. VICKERS, D.V.M., Columbia, South Carolina

The first disease condition to fall under the broad category of diseases manifest by tremors, convulsions and/or evidence of central nervous system involvement is Aujesky's disease or pseudo-rabies.

Aujesky's Disease or Pseudo-rabies

Cause. The cause of this disease condition is a virus.

Predisposing Cause. Rats, as carriers of the responsible virus, constitute the predisposing cause.

Age Incidence. The condition may occur in swine of all ages, but signs of the infection are manifest primarily in suckling pigs.

Signs of the Disease. The incubation period is from one to four weeks. Pigs become dull, lose appetite, walk aimlessly around the pen. Temperature rises 104 to 107 F. Muscular tremors all over body are evident. Incoordination and excitability develop. Paralysis supervenes. Pigs appear blind, rubbing noses against walls. Spasms abate and return with excitement. Frothing at the mouth, champing of jaws and vomiting occur. The course may be very rapid. They may pass from normal to coma and death within a few hours. The younger the pigs, the more severe the signs. The entire litter may be involved. Occasionally, even a paralyzed animal may recover. The disease is mild and may pass unrecognized in older swine. The mortality rate is high in young pigs, and low in older swine.

No outstanding changes are noted at necropsy. Hyperemia of brain is evident.

Diagnosis. Positive diagnosis is available by animal inoculation (rabbit) with development of itching and death. It can be differentiated from rabies because pigs with Aujesky's disease are not aggressive. It should be considered as a possibility in young pigs dying suddenly.

Treatment. Hog cholera antiserum should be administered since it probably contains antibodies against Aujesky's disease.

Prevention. Rats are known to spread the disease. Therefore, a rat control program should be instituted.

Hypoglycemia

Cause. A failure of glucogenesis. The reserve glycogen in the liver is rapidly utilized during the first few hours of life and the condition becomes acute and fatal if food is not provided.

Predisposing Causes. Starvation, usually the result of agalactia in the sow, from whatever cause; chilling (environmental temperatures below 70 F.); impared appetite or abnormal digestion or absorption from any cause in the pig — all are predisposing causes.

Age Incidence. This condition occurs the first few days after farrowing, usually from one day to four days.

Signs of the Disease. The condition may affect only one pig in one litter, or it may affect several pigs in one or several litters. Pigs become weak and listless, lose their appetite, shiver and tremble, squeal weakly, and some scour. Finally the disease progresses to the point where they are unable to stand. They lie on their sides and make galloping movements with their legs. Convulsions and finally coma always characterize the terminal stages. The head is pulled backward, or to one side and they make convulsive or champing movements with their jaws. Froth forms about the mouth. The body temperature drops, sometimes below 95 F. The skin is cold and the hair appears rough and stands upright. There is no marked dehydration during the course of the disease which may last for 24 to 72 hours. The mortality is from 70% to 90% of those affected.

There is usually no gross pathology at necropsy. Occasionally, the kidneys and liver appear dark and congested due to poor circulation during terminal stages. If scouring has developed, it may be due to secondary complications. In these cases, the gastro-intestinal tract is inflamed and the contents are foul smelling, semi-liquid and grayish or yellowish-white.

Diagnosis. Diagnosis is based on determination of the blood sugar. Normally

the blood sugar level may fluctuate between 60 and 140 mg. per 100 ml. with an average of approximately 100 mg. If the concentration remains above 50 mg. percent, no signs of hypoglycemia develop. If it falls below 40, signs develop and when it falls as low as 20, convulsions develop. In hypoglycemia there is no dehydration such as found in TGE and uremia-toxemia.

Treatment. Intraperitoneal injections of 5% dextrose in saline, usually about 10 cc. repeated each 12 hours to effect, are indicated. Hand feed every two hours and provide heat. Parenamine (Winthrop) 10 cc. intraperitoneally in purebreds. Five to 10 cc. of a 20% glucose solution, orally using a spring bottom oil can may be given. One formula that has been used successfully is 1 qt. of whole cows milk with 2 oz. of added cream and 1 oz. of added corn syrup. Two ounces of this mixture are given every two hours. Often able to put back on sow in 12 to 24 hours.

Treatment must be given early. There is temporary stimulation, even if they have been in a coma for less than two hours, but these cases usually do not recover. Some cases treated early in the stages of coma may recover. Of course, some die despite treatment.

Prevention. Prevent chilling and starvation. Sows should be checked frequently since some cases of agalactia develop without any signs being manifest in the sow.

Myoclonia Congenita (Trembles)

Cause. Cause is not known, but it has been suggested that it may be (1) hereditary, (2) a subclinical viral infection in the dam during the gestation period causing an infection of the fetus during the "sensitive period," or (3) nutritional disturbance in the dam.

Age Incidence. Symptoms appear at birth or shortly thereafter.

Signs of the Disease. At birth, or shortly thereafter, a few or all of the pigs in a litter show signs of the infection. There are visible rhythmic tremors of different skeletal muscle groups. The tremor may be noted on the head, or it may affect the hind limbs or can be generalized. The tremors may be so fine as to almost be unnoticed or they may be marked, so that if it affects the limbs, the pig may literally seem to jump off the ground. As soon as the pig lies down, the tremors decrease in intensity and often seem to disappear entirely. Upon regaining their feet, tremors reappear. In seriously affected pigs, the tremors are continuous when standing. If the pigs survive for four to five days, the prognosis is good. There is a gradual recession of the tremors. Mild cases show recovery in a few hours, whereas severe cases last for weeks or even months. The tremor is aggravated by the ingestion of cold liquids, excitement, or a cold environment. Animals no longer exhibiting tremors, may begin trembling when excited or stressed in any way. The mortality rate is usually low.

There are no visible lesions at necropsy unless secondarily complicated. Microscopic changes in the brain have been reported, but they are not diagnostic.

Diagnosis. The disease is distinctive, and it is doubtful if it would be confused with other baby pig diseases. The pigs appear perfectly healthy, and only the tremor is present to indicate a disease entity.

Treatment. No treatment is known. Chilling and excitement should be avoided, however. Pigs should be kept warm.

Prevention. No preventive measures are available.

Uremia-toxemia

Cause. The specific cause is not known. There is some indication that it is a toxic factor in the sow's milk. In this condition, nitrogenous products of metabolism increase in the blood above normal, presumably due to failure of the kidneys to excrete this material.

Age Incidence. This condition may develop as early as the first day of life but usually at three to eight days of age.

Signs of the Infection. Uremia-toxemia may affect several litters in a herd. The

course can be acute, subacute or chronic. The acute course lasts from 36 to 96 hours; the chronic course runs 30 days to 40 days. Pigs appear unthrifty with a rough, staring coat. Gastro-intestinal symptoms appear manifest by vomiting and diarrhea. They are hyper-sensitive; isolate themselves, squeal and show central nervous system involvement manifest by shivering, trembling, and later convulsions. Convulsions usually precede death. Pigs become dehydrated and the temperature drops to sub-normal. Mortality rate on a case basis is usually 90% to 100%.

Urates and uric acid deposits are noted in papillary ducts of the kidneys, the renal pelvis, ureters or bladder at necropsy. These deposits are orange or white colored. The kidneys are pale. There is hyperemia of the gastric and intestinal mucosa. The adrenals are pale and slightly enlarged. Mesenteric vessels are engorged.

Diagnosis. Increase in blood-urea-nitrogen and the necropsy findings suggest the proper diagnosis.

Treatment. Nothing can be done for immediately affected pigs. Take off dam and put on foster mother, or formula.

Prevention. Since there is some evidence to indicate disease may be due to a lack of high intake of fluids, anything done to stimulate flow of dam's milk might be beneficial.

Listeriosis

Cause. Listeriosis is caused by a bacterium, *Listeria monocytogenes.*

Predisposing Cause. No predisposing causes are definitely known.

Age Incidence. Swine of any age may be affected but the disease is more severe in young swine and does occur in baby pigs.

Signs of the disease. There is a considerable variation in clinical signs in affected swine. Listeriosis may occur concurrently with other diseases. Elevations in temperature occur, but are not a consistent finding. Signs of infection that have been reported vary from a mild, almost inapparent illness to any or all of the following: circling, staggering, a stilted gait, "red eyes," shaking and trembling, jerking movements of the head and back, dragging of the hind legs, and posterior paralysis. The most characteristic signs observed in one outbreak in baby pigs were diarrhea, weakness, stiffness, and some of the pigs were down and unable to rise. In baby pigs the course is rapid, usually terminating in death in four days. The mortality rate is high in older swine, but the morbidity is low. In young pigs the mortality and morbidity are apt to be high.

Lesions observed at necropsy are not diagnostic. A few petechial hemorrhages may be found on the heart and kidneys. Necrotic foci have been observed in the liver. In some cases there may be only moderate congestion of the viscera. In an outbreak of Listeriosis in baby pigs, lesions observed at necropsy were, moderate congestion of the lungs, severe hemorrhage of the small intestines with free blood in the lumen, icterus and a mild anemia.

Diagnosis. An accurate diagnosis depends on isolation of the causative organism by cultural methods. Histopathological studies of the central nervous tissue usually reveal meningitis, perivascular cuffing and focal infiltration. There is usually an increase of monocytic cells in the blood. Listeriosis must be differentiated from other diseases exhibiting central nervous system involvement including hog cholera, Aujesky's disease, and certain plant and chemical poisonings.

Treatment. Older animals respond to treatment better than baby pigs. The use of hog cholera antiserum, penicillin, Streptomycin and various sulfa drugs has been reported beneficial. Terramycin (5 gm.) added to 500 cc. of hog cholera antiserum and given intraperitoneally at the rate of 1 cc. per pound of body weight has given encouraging results.

Prevention. Since little is known about the method of transmission or predisposing causes, there are no recommendations as to prevention. Attempts are being made to prepare a bacterin.

Other Diseases

Nicotinic acid and other deficiency diseases may be manifest by convulsions or "fits."

Hog cholera, listeriosis and edema disease or gut edema may produce signs of central nervous system involvement. Tetanus may occur in baby pigs, possibly even infecting them postnatally through the navel. Signs of tetanus are so distinctive and well known that a discusion does not seem necessary.

Continued on page 72

Barley as Grain and Roughage for Fattening Cattle

A series of six experiments has developed a new concept of feeding barley to fattening cattle, according to a report presented at 51st annual meeting of American Society of Animal Production, November 27-28, 1959. Previously, limited gains on barley could be attributed to excessive roughage intake from both hay and the hull portion of the barley. The first three experiments were pilot tests using 21 steers to study the effect of feeding only properly supplemented barley on a full feed basis. Barley from different areas of the country was used. The barley was rolled to preserve the roughage characteristic of the hulls and the supplement was a commercial fortified 32% protein supplement fed at the rate of two pounds per head per day. The last three experiments were direct comparisons with 82 steers to compare cattle full fed on rolled barley and supplement versus ground ear corn and supplement.

TABLE 1. Preliminary Tests With Rolled Common Barley Serving as Both Grain and Roughage for Fattening Steers

Experiment No.	1	2		3
	Feeding Barley	Minnesota Feeding Barley	Pacific Coast Heavy Barley	Feeding Barley
No. of Steers	3	4	4	10
No. of days on feed	140	28	28	145
Av. initial weight, lb.	631	537	534	728
Av. daily gain, lb.	2.70	3.53	4.10	3.06
Av. daily feed, lb.	20.85	16.46	16.30	23.17

TABLE 2. Summary of Comparisons Between Rolled Barley Versus Ground Ear Corn for Fattening Steers, (Experiments 4, 5, and 6)

Comparison	Ground Ear Corn	Rolled Barley
No. of steers (4 tests)	40	42
Av. initial weight, lb.	647	647
Av. daily gain, lbs.[a] (153 days)	2.63	2.95
Feed per cwt. gain, lb.[b]	865	708

[a]Least significant difference for P-5% and 1% respectively is 0.19 and 0.25 lbs. daily gain.

[b]Least significant difference for P-5% and 1% respectively is 41 and 75 lbs. feed per cwt. gain.

Steers gained rapidly and efficiently on a complete fattening ration using adequately supplemented rolled common barley as a sole source of both the grain and roughage. The cattle fed barley according to this new concept gained significantly faster and more efficiently than comparable steers on ground ear corn. Differences in selling price, shipping shrink, dressing percent, and carcass grade were small and insignificant even though slightly in favor of barley.– *H. B. Geurin, J. L. Williamson, J. C. Thompson, H. L. Wilcke and R. M. Bethke, Ralston Purina Company Research Department, Saint Louis, Missouri.*

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Indianapolis 6, Indiana

Presented at the 26th annual meeting of the A.A.H.A., Colorado Springs, May 6-9, 1959.

Special Report

LEAVE ADMINISTRATION HEADACHES TO A BUSINESS MANAGER

JOHN MICUDA, D.V.M.

Phoenix, Arizona

THE PRECISE MOMENT a veterinarian opens the front door of his new hospital, he is emerging on a strange and bold adventure, an adventure that is new to many veterinarians. It is an adventure into the world of business with all its complexities.

No matter how capable a veterinarian or young graduate may be in his chosen profession, if he has no business sense, his venture is doomed from the start, or at least to an insufficient net income commensurate with his many years of long preparation and training. Indeed fortunate is the young graduate who decides to get into the business world by establishing himself with a veterinarian who has made a success in the operation of a veterinary hospital.

The novice will quickly learn that there is much more to operating a successful veterinary hospital than practicing veterinary medicine. He must be a psychologist, since he is dealing not only with ill pets but also the emotions of the owners.

He must be a good bill collector. He must have a knowledge of bookkeeping. He must know business law. He must know something about the construction of buildings and materials. He must have executive ability in order to deal with his employees. He must remember names and faces of his clients, and a very favorable element is introduced if he can also remember the names of the pets that he has to deal with.

It is most advantageous if he also possesses some ability as a public speaker.

Trying to do all of these things in addition to the practice of veterinary medicine will sooner or later build up tensions.

Veterinary colleges should possibly add to their already overloaded curriculum one more course of study, a course in business management as it pertains to the operation of a veterinary hospital, from the choosing of the land, to the final construction and administration.

Obviously, the training the veterinarian gets in college does not qualify him as a business manager. In a veterinary hospital, where one, two, or more doctors are busy, it is almost impossible for any one of them to administer to the affairs of the hospital with skill and economy. So they take in a third doctor for the pur-

pose of freeing one of them to help administer the business affairs.

Soon business picks up and all three are busy in the practice of veterinary medicine again. At the same time money is being lost in the front office due to inadequate and improper business management.

Now, these questions must be answered. Is his time more valuable in administering to the business part of the practice or to the actual practice of veterinary medicine? Might it not be more profitable to hire a professional and free the veterinarian to do the work for which he is trained, the same as we would hire a laboratory technician to do a job better than we can do it ourselves?

The Manager

We are all familiar with the great clinic founded by the Mayo Brothers. There was a brief period during the early history of this world famous institution when its growth was at a complete standstill. The members were at serious disagreement over financial matters. In fact, several law suits were in the making and at least one had to be settled by the courts. It was not until Dr. Will Mayo was advised to separate the business part of this professional practice from the professional part, by hiring a business manager to administer to the financial end of this great undertaking, that success became assurred. This permitted the doctors to pursue their life's work unhampered by the financial involvements of the rapidly growing clinic. From this point on, the success of the Mayo Clinic became a certainty.

The increase in group practice among veterinary hospitals is quite significant, and shows a definite trend. The role of business management in veterinary hospitals will become more and more important. To you men who have a group practice, give this matter serious consideration if you wish to grow and keep pace with the trend.

Many of the members of our profession are specialists in some chosen field. This is also a trend that is becoming apparent more and more from day to day. Taking valuable time from your hospital to pore over bills and invoices and sign checks, or to settle petty difficulties among your employees, is not conducive to good judgment.

Duties of a Business Manager

Here is a partial list of what our business manager did for us. He had complete charge of the office personnel. This included training the receptionist to answer the phone, and to keep clients happy. He kept complete books on all our financial matters in such a way as to satisfy the government officials and our own certified public accountant. He kept a complete and running inventory of drugs and biologics at all times. There is nothing more devastating to my temper at our hospital than to go into the refrigerator for a biologic that is not there.

He also planned the vacations for our personnel so that their time would not overlap, and yet we would not be left without adequate help. He made all the arrangements to see that a visiting veterinarian was taken care of as to lodging, entertainment, and started on his way again after visiting in our area.

The biggest job he had was in processing delinquent accounts. Our practice is about one-third charge accounts, and about 50% of these one-third charge accounts were non-collectible until our business manager took them in hand. He earned his salary the first year just in collecting these delinquent accounts.

We also use our business manager as a whipping boy when a dissatisfied client comes in and jumps on the veterinarian's neck regarding a bill. The veterinarian, wherever he can, shoves the responsibility—if he can do so—to our business manager. Hiring and firing of non-professional help was left in his hands also. He was responsible for the cleanliness of the hospital. Occasionally he had to double for the receptionist. We finally ended up during the last year of his stay with us by giving him the power—and he would be the only person in our hospital who had the power—to extend credit. If the client came to one of the

veterinarians and asked for credit, he would very politely say that he did the professional work, and the business end was out of his hands. The client had to see our business manager, make arrangements with him for credit. About half of these said, "Just forget it, we will pay the cash as we go out of here."

When the head veterinarian is absent, the business manager's job is to keep the other professional help from getting in each other's hair. He had no authority as far as professional work was concerned, but he was responsible for the profit and loss of the hospital. There is no greater experience than for the veterinarian to be able to divorce himself from the financial end of a busy practice.

Cost Accounting

Our business manager also had a breakdown of every department in our operation. We quickly found that some of our operations that we thought we were making money in, we were actually losing money. We did one of two things: either cut down the salary of the employees in that department, or eliminate that department entirely. In the last two years, we have eliminated clipping of fancy poodles. We found out after two years that that part of our practice was costing us more money than we were getting out of it.

A breakdown of some of the departments and the percent of business each department accounted for in our practice might be of interest.

The surgery department amounted to 14.35% of our total gross income. The *x*-ray department amounted to 1.01%. Our hospitalization was 3.98% of our gross income. Distemper vaccinations, and all avian type vaccinations, amounted to 4.68%. Hepatitis tissue vaccinations, 1%; leptospirosis vaccinations, .1%; rabies vaccinations, 5.57%; enteritis vaccination in cats, 1.82%.

Clips amounted to 2.31% in our practice, and we found that the department was losing money. Also, a department that we wanted to obliterate but could not, was bathing. The income from our bath department was 3%. Those are just clients who brought their dogs in to be bathed and no treatment administered. Tick and flea dips amounted to 2.46%. Here is an interesting item: euthanasia amounted to 1.27% in our practice. Drugs dispensed or prescriptions refilled, 8.1%.

Our boarding department more than paid our income tax. It amounted to 15.35%. We found that what we called boarding dogs, did not increase our payroll. We still managed to board a few of these dogs without any added help, and we considered that in that department we only put in as cost, a percentage of our over-all operation.

Our in and out patient clinic, or so-called treatment cases, amounted to the bulk of our practice, which was 35%.

At the present time, the business end of our practice is being handled by a member of our staff who shows a lot of promise as an executive.

Antibody Development

In professional circles it is well known that canine distemper vaccine and canine virus hepatitis vaccine, when administered simultaneously or in combination, are not antagonistic. They do not have an interfering action on antibody development specific for the two viral conditions. As another step in the same general direction, there is now evidence that when these two vaccines are administered, a third immunizing agent, *i.e.*, canine leptospirosis vaccine, may be inoculated with no antagonism between the three in specific antibody development for each of the diseases.

FELINE THORACENTESIS

JULIUS FISHLER, D.V.M.

Elkhart, Indiana

DURING or right after an epizootic of feline pneumonitis, the small animal practitioner is frequently confronted with patients exhibiting severe dyspnea. They stand with their shoulders hunched and appear unthrifty. There is usually quite a bit of time to attempt treatment since the animals take a long time to die. An *x*-ray examination usually reveals lungs to be compressed upward. The lower part of the thorax is filled with fluid and it is impossible to discern a diaphragm. The thorax appears to be continuous with the abdomen.

Sometimes fluid will be evident on both sides and sometimes only on one side. It is not necessary to routinely use an *x*-ray for diagnosis. This can be made by simply tapping the chest.

To make the puncture, use a 16 gauge needle and a 10 cc. hypodermic syringe. Go in at the fourth from the last intercostal space, but as far down as you can, with the cat standing. The object is to come just ahead of the diaphragm and as low on the cat's thorax as possible.

Three types of fluid are generally encountered. One is a heavy, creamy pus. Another type is a clear, light straw colored flund. With the heavy, creamy pus types we have the best results. It would hardly seem possible to save such a patient, yet eight out of ten can be saved by draining the pus out until no more forms.

The third or bloody serum type, we hardly ever save. We never give any of these cats an anesthetic. They cannot even stand a tranquilizer. Sedation or tranquilization will usually result in death. We have also found that by injecting antibiotics into the thorax after fluid removal, a slight increase can be expected in the mortality rate. It is better to drain the fluid and treat the cat with antibiotics intramuscularly.

Whenever bloody fluid is encountered, a very high mortality rate can be expected. You will do well if you save one out of ten or 12.

Presented at the 26th annual meeting of the A.A.H.A., Colorado Springs, May 6-9, 1959.

Evaluation of a Drug for Dermatoses

J. BRUCE WENGER, D.V.M.
Columbus, Ohio

The thiocyanates were successfully employed by Dr. McKenzie Heath[1] for the treatment of various dermatoses including those of ectoparasitic etiologies. Treatment proved 91% effective in cases of both demodectic and sarcoptic mange, and approximately 90% effective in cases classified as eczema. The thiocyanate mixture was also effective against fleas, and lice.

Thiocyanate toxicity studies were performed by Lindberg *et al.*[2] resulting in no gross or histopathological changes in the heart, kidneys, spleen, pancreas, lungs and thyroid gland when toxic doses of thiocyanate were administered to normal animals. Oral thiocyanate therapy has been extensively employed in treatment of medical hypertension. Barker,[3] Mosenthal,[4] and Griffith *et al.*[5] have discussed this mode of medicinal therapy.

Wald *et al.*[6] and Golding *et al.*[7] have demonstrated the fact that the thiocyanates will permeate all body tissues in essentially the same concentration. This study indicated that the chemical combination of thiocyanate with triethanolamine would result in a dermal penetrating effect of the insecticidal SCN radical which is of very low toxicity.

Effectiveness of such a product (Thera-Tergent—Warren-Teed) depends upon correct administration. To obtain optimal effectiveness the procedure should entail the complete wetting of the skin and hair coat, followed by application of enough of the concentrated shampoo base (1 to 2 oz.) to produce a heavy lather. Vigorous massage of the shampoo into the skin is important; the use of a semi-stiff bristle brush works well for the seborrheic-type case. Special attention should be given to the most severe dermal pathology. Following a contact time of 10 to 15 minutes or more, the animal should be rinsed thoroughly. The number of applications and contact time should be based on the severity of dermal pathology and resulting responses.

Cases treated at this hospital varied from specifically diagnosed cases to those classified as nonspecific dermatoses. The cases diagnosed as specific disease entities included those of demodectic and sarcoptic mange, otodectic (ear mites), mycotic, allergic, seborrheic and nonspecific dermatoses. Cases diagnosed as being of endocrine origin were not included in this study of 224 cases.

The product, Thera-Tergent, as employed by our staff for various forms of dermatosis proved to possess advantages not elicited by other commonly used therapeutic shampoos (selenium sulfide, triphenylstibine sulfide, polythionates).

Unique advantages elicited when using Thera-Tergent were:

1. A reduction of pruritus and exfoliation due to the excellent oil-replacing ingredient.
2. The hair coat of animals exhibited a much better appearance, being very glossy without repeated rinses.
3. Scratching between treatments was not a problem; prolonged relief of pruritus was an outstanding benefit, indicating a possible repository mechanism of action.
4. Application was easier since its distribution over body was more even and could be massaged into the hair coat very readily.
5. No respiratory distress was produced in the animal or operator.

BEFORE TREATMENT

AFTER TREATMENT

BEFORE TREATMENT

AFTER TREATMENT

6. The product was safely used on cats without special precautionary rinses or enemas.

7. Applications can be repeated without irritation to hands of the user or skin and genitalia of the animal.

8. Thera-Tergent provided excellent ear mite therapy when used as a flush at a 1:4 dilution; no pathological changes of the sensitive membranes of the ear were evidenced.

9. Excellent wound healing properties were revealed by use of this product, as well as reduced healing time and serum exudation.

10. It was a definite aid in controlling parasites, especially fleas, as well as bacterial and fungal infections of the skin.

11. No incompatibilities with metals were noted.

12. The client reception was excellent, therefore better responses were elicited when Tera-Tergent was dispensed.

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Concluded next page

TABLE 1. Clinical Evaluation of Thera-Vargent

Breed	Diagnosis	No. of Treatments	Interval Between Treatments	Contact Time	Side Effects	Results	Comments
German shepherd	Demodectic mange	10	24 hr.	5 min.	None	Skin scrapings negative at end of treatment.	Evidence of new hair growth.
German shepherd	*Microsporum** *canis*	7	24 hr.	10 min.	None	Apparent control.	Rechecked 3 weeks later—skin normal, culture negative.
Beagle	Demodectic mange	6	Every 24 hr. for 4 days	10 min.	None	Skin scrapings negative.	New hair growth over previously denuded area.
Cocker	Nonspecific dermatitis	1		10 min.	None	Prompt cessation of pruritis.	Clinically normal.
Spitz	Allergic dermatitis	2	2 weeks	15 min.	None	Good control.	Animal normal for 2 weeks, controlled pruritis.
Beagle	Demodectic mange	2	2 weeks	10 min.	None	Negative.	Negative skin scrapings. Normal.
Dalmatian	Nonspecific dermatitis	3	3 days	10 min.	None	Cessation of shedding and pruritis.	Good response. Normal.
Boxer	Demodectic mange	4	First 3 treatments at 1 week interval. Last treatment 2 week interval.	10 min.	None	Improvement after 2nd bath. Scrapings negative after 4th.	Very responsive to therapy.
Collie	*Microsporum** *canis*	6	7 days	10 min.	None	Microscopically negative. Cessation of pruritis.	Uneventful response and recovery.
Dachshund litter of 4	*Microsporum** *canis*	3 of the litter received 4 treatments, intervals of 5 days. The fourth pup received 4 treatments at 5 day intervals and 2 treatments at weekly intervals.		10 min.	None	Complete healing.	Normal, negative skin culture.
Collie X	Sarcoptic mange	12	1 weekly	10 min.	None	Complete return of normal hair.	Open lesions and thickening began clearing at end of 3rd threament.
Hounds 6 pups 14 weeks old	Sarcoptic mange	6	Every other day for 2 weeks	5 min.	Animal developed a diarrhea questionable as to cause.	All pups' lesions, alopecia and pruritis cleared.	Very good response.
Feline	Nonspecific. Present for 3 months	4	2 per week	10 min.	None	Cessation of alopecia and pruritis.	Kept on vitamin A and vitamin D capsules daily. No further difficulty.
Feline	Otodectic (ear mites)	2	1 week	Flushed ears well	None		Diluted with water 1:10 and flushed. No further treatment given. After initial treatment, no evidence of mites 2 months later. Instilled 3 drops of Tympacaine each ear daily after first treatment.
Cocker	Seborrheic	12	2 times week	15 min.	None	Good.	Improvement noted after 3rd week —animal apparently normal in 2 months, but condition reoccurred 3 months after treatments stopped. Course was repeated and is now doing well on periodic treatments.

*Confirmed by C.D.C., Chamblee, Georgia.

Microbial Sensitivity Testing

LEWIS B. HUFF, D.V.M.

Covina, California

IT IS OUR RESPONSIBILITY as veterinarians to use drugs developed during the past 20 years as efficiently as possible in their application to infectious problems. A method which has been used to insure this efficiency has been the *in vitro* bacteriology sensitivity test. Simply speaking, this is a procedure to determine those antibiotics which are effective in inhibiting the bacteria from growing on an agar plate.

It is essential that I offer some qualifications regarding this test as it is used in most veterinary hospitals. In human medicine, sensitivity plates are correlated with proper identification of the organism grown. Since few animal hospitals have the elaborate facilities necessary for the identification of bacteria, we must constantly keep in mind the possibility of non-pathogenic contaminants as we interpret our results. This fact will also limit somewhat the scope to which we may use this test in small animal medicine.

Our clinical response in the treatment of infections has proved so much more effective since incorporating sensitivity testing in our practice that I am sure its value is much greater than its limitations.

In performing this test the following inexpensive material and equipment is needed: a small thermostatically controlled incubator which can be obtained for as little as $20.; agar media plates which are available from commercial laboratories at 45 to 60 cents, depending upon the quantity ordered; sensitivity disc rings which are available from laboratories, such as Difco, for 14 cents each; and cotton tipped swabs and vials which can be prepared at practically no cost in an autoclave. The sensitivity disc ring that I use contains eight different antibiotics and I find it more simple to use than placing the individual discs.

The first procedure of the test consists of collecting the specimen on a sterile swab. Extreme care should be used in this collection to assure a culture as free from contaminants as possible. The sterile cotton tipped applicator should be inserted into the center of the infection with care to avoid contamination from the surrounding areas. This material is then spread evenly on the media plate in a manner that will assure even growth. With sterile forceps the sensitivity disc ring is carefully laid on top of the inoculated media plate. The dish is then inverted and placed into an incubator set at a temperature of 37 C. for a period of 18 to 24 hours.

Blood agar plates are used most frequently in this test. I use them for infections involving ears, wounds, abscesses and the urinary tract. In the culturing of feces in a chronic diarrhea problem, one must use a selective media such as S.S. agar. This permits growth of Salmonella, Schegella, and pathogenic Proteus while inhibiting the growth of non-pathogens. Because ear infections are so commonly the result of mycotic etiology, I routinely inoculate along with the blood agar plate a second plate containing Sabouraud media for possible fungi. The Sabouraud plate is left at room temperature for up to six weeks. Some indication

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of growth is usually evident by ten to 14 days. This Sabouraud plate is used only for the isolation of possible mycoses and not for sensitivity testing. In the culturing of urine one must use extreme care in obtaining the sample.

I use a sterile catheter and collect the urine in a sterile cotton plugged centrifuge tube. This is then centrifuged to concentrate any bacteria present for inoculation. The application of the sensitivity test is limited in throat and mouth infections because of the great number of non-pathogens comprising the normal flora. It would be necessary to have a laboratory identify the organisms which grow in order to determine whether they are pathogenic, as growth of some type occurs in practically all mouth cultures.

Interpretation of the incubated plates is accomplished by observing the zones of inhibition around the antibiotic discs. This is only a qualitative test which is read as either a resistance or sensitivity of the bacteria to the drugs. The presence of an inhibition zone of any size is considered sensitive. Resistance is observed when the bacteria grow completely to the antibiotic disc. It would be an error to attempt to rate the effectiveness of the antibiotics by measuring the size of the zone of inhibition. These zones will vary in size due to the diffusion of the antibiotic through the media as well as the susceptibility of the organism to the antibiotic. Some of the drugs are of such molecular size that they do not diffuse rapidly in laboratory media but will build up therapeutic levels quickly in the animal's body. If several antibiotics show sensitivity the one of choice would be the drug that is best tolerated, least expensive or easiest to administer.

Our charge to the client for this test has been $5. In most cases the clients have been quite appreciative of this service for their animals.

When purchasing antibiotic discs it is well to select those containing five to 10 micrograms of the antibiotic. Any bacterium might be made to appear sensitive to any of a number of antibiotics if the concentrations available in the discs are high enough. It should also be noted that the discs are dated and must be refrigerated. Sometimes an antibiotic may give a poor showing because the potency has been lost by excessively long storage. The media will also deteriorate with age. Blood agar plates will begin to turn brown after about eight weeks when hemolysis of the blood begins.

I feel that I can offer no better conclusion than to quote a statement made by Doctor Fink of Pfizer Laboratories in which he said, "Any microbial sensitivity test, carefully performed, is an ethical attempt to channel the antibiotic materials to the right place at the earliest possible moment in therapy."

Mineral Deficiency

Pharmaceutical evidence indicates that vitamin D is unstable in the presence of more than 25% of minerals. This includes some mineral feeds. Researchers have demonstrated that cod liver oil—this is normally rich in vitamin D—lost its vitamin D rapidly when ground limestone was added to it at a temperature of 85 to 100 F. Calcium salts—calcium phosphate in particular—seem to have this action in relation to this essential vitamin. An attempt is being made to coat vitamin D so as to protect it in the presence of minerals. Results are inconclusive.

It has been indicated that some feed processors add a larger than the usual amount of vitamin D to feeds, but in a month or two the combination, if it also contains a calcium mineral, is found to be low in vitamin D. From the present knowledge it may therefore be inferred that a combination of bone meal and exposure to direct sunlight—the latter instead of vitamin D—is better than the combination of calcium and vitamin D in the handling of mineral deficiency in animals.—*R. R. Dykstra, D.V.M.*

Here each month are published ideas, suggestions and comments picked up by VM reporters.

Small Animal Clinic

Reynolds Aluminum from the "do it yourself" section of the hardware store provides excellent splint material. It cuts easily and is used primarily in small dogs and fractures of the radius.

A Slatted Trough on the operating table is useful for handling large dogs with sharp razor backs. It is helpful in *x*-ray therapy, surgery or any procedure requiring dorsal recumbency.

An Electrician's Pliers with compound action are useful for crimping the dog's ear that requires a tip that bends over. The pliers have a flat jaw with a groove in one jaw for stripping wire. A small Kirschner stainless steel rod is placed in the groove and held with scotch tape. Set the pliers where you want the ear to break and give it a squeeze. Bend the ear over and use a little adhesive tape to hold in position.

A **Plastic Pump Dispenser** for a gallon bottle is a convenient hand lotion dispenser for the hospital.

Dentistry is a valuable small animal service. A dentist's laboratory drill serves very well. It has a foot switch with variable speed control, and is the most profitable device a practice can own. Most dental supply houses have them available second hand. The entire outlay for dental equipment should cost in the area of $75. A brush, rubber polishing cup, prophylactic paste, pumice, and glass dish to mix ingredients, account for miscellaneous accessories. Paste plus a little medium grade pumice stone gives best results. Morris scalers offer a handle with replaceable tips. Disposable tips come in a box of six and cost $2.75. A bone rongeur is extremely handy to remove gum tumors, a condition commonly observed in boxers and others with malalignment of teeth.

Polyethylene Tubing, as found on intravenous equipment, will fit into the end of a needle with no loss of vacuum for blood transfusions.

An Aluminum Bread Pan turned upside down makes an excellent sterilizing rack. Holes cut in the pan bottom will hold syringes and equipment upright. Small legs under the unit complete the job and permit use directly from the rack. The unit should be covered with a towel for sterilization.

To Eliminate Cleaning up nails after trimming, fasten a small plastic pill box to a Resco Trimmer with two screws. Nails drop in the box and not on the floor.—*W. A. Crago, D.V.M., Indiana State Meeting.*

Hydrotherapy for a Dog

An eight year old spayed female Collie was presented for treatment following an accident in which digits and parts of the metatarsals of the left foot had been ground away by a truck wheel. The right coxofemoral joint was luxated. The dog was treated for shock and the following day the left limb was amputated at the femorotibial joint. Luxation was corrected and an Ehmer's sling applied.

The wound over the amputation healed by first intention and the Ehmer's sling was removed after six days. The dog, however, refused to use her right limb. Ample sensation was evident, but no attempt was made by the animal to extend the limb, perhaps because of a fear complex. Steroids were tried, and we did our best to get the dog to use the limb, but to no avail. After three weeks the owner asked that euthanasia be carried out.

Since we wanted to give the dog a last chance, I persuaded the owner to give me a few more days. I procured an old 250 gallon oil drum, had the end cut out and proceeded to patch the many tiny holes. It was filled with lukewarm water to within 6 in. of the top and the dog lowered into it. The animal immediately began floundering to keep from going under, and became exhausted in a minute or so. This was repeated the following day but instead of floundering she extended her rear limb, resting on the bottom.

After being dried in the cage and placed on the floor, the dog extended her leg and supported herself for an instant. This procedure was repeated daily. In a week she was able to walk. Now, 11 months later she is walking, running and doing everything except descending stairs.

This hydrotherapy could be useful in treating partially paralyzed dogs and cats. —*Howard O. Weber, D.V.M.*

Oral Medications for Ponies

The administration of oral medications to a sick pony is often difficult. Many times ponies are so small that practitioners are fearful of a possible choke or pharyngeal injury if the balling gun is used. One usually doesn't want to take the trouble of passing the stomach tube. The pony is usually off feed so the medicine can not be administered in the feed or water.

The simplest solution to the problem is in the use of an electuary; a compound made and administered by mixing the powdered drug with Karo syrup, honey or molasses and smearing it on the lips and muzzle. A pony, even a sick one, will lick from his lips and nose every particle. One demonstration is sufficient to enable the slowest of clients to administer further medication as may be dispensed and directed.—*Paul E. Hoffman, D.V.M., Georgia Veterinarian, January - February 1959.*

Short Course on Spinal Conditions

A postgraduate short course on spinal conditions of the dog will be offered by the Department of Small Animal Surgery and Medicine, Auburn University, Auburn, Alabama, on March 16, 17, and 18. This short course will cover the anatomy, physiology, physical and radiographic diagnosis, and treatment of the various clinical spinal conditions of the dog.

Surgical correction of disc and spinal fractures will be emphasized. The fee for the short course is $50. A letter of application and a check made payable to Auburn University should be mailed to the above department. Any applicant who is not accepted because of a full class will have his check refunded. Maximum enrollment is 12.—*B. F. Hoerlein, Head, Small Animal Surgery & Medicine.*

Mast Cell Tumors

Mastocytomas may be rapidly diagnosed by the veterinarian as follows:

1. Gently press a clean glass slide against the cut surface of the tumor. In this way, the tumor cells will adhere to the slide.

2. Stain with Wright's stain with the same technic used for staining blood smears. —*Atlas Newsletter.*

CLINICAL REPORT

CONTROLLING EXTERNAL PARASITES WITH BAYER 21/199

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DURING THE SUMMER OF 1958, Bayer 21/199 (Co-Ral—Chemagro) was used on several ranches in the Edwards Plateau region of Texas as a spray on livestock to control screwworms, cattle grubs and other external parasites. Since Bayer 21/199 is a systemic poison for cattle grubs, it appeared logical to some persons that sperm may be injured or killed when such a systemic insecticide is used on male animals. In that no information was available concerning this possibility, it became necessary to determine the effect, if any, of Bayer 21/199 on the semen.

Materials and Methods

Six healthy, mature Rambouillet rams were selected from the flock at the Experiment Station. The previous year all of these rams were known to have sired lambs. All rams were in excellent breeding condition and had a six months wool growth at the beginning of the experiment. A seventh ram was donated by a local rancher, and was shorn on the day it was placed on test. The owner of this ram stated that the ram had sired lambs the previous year. Semen samples were collected from all of the rams with an electro-ejaculator and viable sperm were found in all samples prior to treatment.

The manufacturer's recommendations state that Bayer 21/199 should be used in a 0.25% concentration for spraying sheep and goats. A full application should not be repeated within 60 days.

TABLE 1. Evaluation of Semen Samples from Rams Treated with Bayer 21/199

Ram No.	Treatment	Days After Initial Treatment																												
		0	4	6	11	14	17	20	24	28	37	42	45	48	52	55	59	62	66	69	73	78	83	90	97	132
1	Control—Untreated	DM GG	DM FG	DM PG	DM FG	DM GP	D G	M G	DM GG	DM GVG	DM PF	DM VG	DM PG	DM VVGG	DM VVGG	DM PP	DM VGG	DM VGG	DM GG	DM VVGG	DM GG	DM GG	DM GG	DM GVG	DM FF	DM FF	DM FG
2	Control—Untreated	GG	FP	VVGG	GG	VGG	G	G	VVGG	VFG	GVG	PF	VVGG	PG	PF	VFG	VPG	GP	VGG	VGG	VGG	PG	FVG	GG	GG	GVG	GF
3	Drenched twice at a 20-day interval using 25 mg./kg. of Bayer 21/199	GG	VVGG	PG	VVGG	VVGG	VG	VG	GG	FVG	VGG	GV G	VVGG	VVGG	VVGG	VVGG	VVGG	VGG	GG	VGG	FG	GG	GVG	FG	GG	GG	GF
4	Sprayed once using 1 gal. of 0.25% solution of Bayer 21/199	GG	GF	VFP	VGP	VFP	No Sperm	No Sperm	FG	VVGG	PP	PF	PG	VPP	PVP	VGG	GG	VPP	VPP	VPP	VPP	VGP	VFP	PP	FF	VFP	VFP
5	Sprayed twice at a 14-day interval using 1 gal. of Bayer 21/199	GG	VFG	GG	FF	GF	VG	VGG	VGG	GG	VVGG	GG	GVG	GG	GP	VFG	VGG	GVG	VVGG	FG	GG	GVG	GG	GVG	GVG	GF	FG
6	Sprayed 4 times at intervals of 11, 3, & 7 days using 1 gal. of Bayer 21/199	GG	GF	GF	VGG	GF	VG	VGG	VVGG	VVGG	GG	GF	GF	GF	VFG	VVGG	GF	FF	GG	VGG	FG	VGG	GG	VGG	GF	GG
7	Shorn ram sprayed twice at a 17-day interval using 1 gal. of Bayer 21/199		GG	VVGG	VVGG	GF	G	VG	PG	VVGG	VGG	VGG	FG	GVG	GVG	PF	VGG	VGG	FG	PG	FG	FG	FF	PP	PF	PF	PG

D = density
M = motility

VG = Very Good, G = Good, F = Fair, VP = Very Poor, P = Poor

One ram (no. 4) was sprayed only once, using one gallon of 0.25% Bayer 21/199. This conformed to current recommendations.

Ram no. 5 was sprayed twice at a 14 day interval with one gallon of 0.25% concentration. Ram no. 6 was sprayed four times at intervals of 11, 3 and 7 days, and the shorn ram, no. 7, was sprayed twice at a 17 day interval using 0.25% concentration. Care was taken in spraying to saturate the testicles and adjoining areas. Ram no. 3 was drenched twice at a 17 day interval at a dosage of 25 mg./kg. per pound of body weight.

Rams no. 1 and 2 were not treated and served as controls.

After the initial treatment with Bayer 21/199, semen samples were obtained twice weekly for a ninety-day period. One collection was made 132 days after the beginning of the test. Semen specimens were obtained by restraining the rams in an extended position on a low table and using an electro-ejaculator. All of the equipment that came in contact with the sperm was maintained at a temperature of 37.5 C., and care was taken to avoid subjecting the sperm to a sudden change of temperature.

Semen was evaluated by observing the density of the sample and the motility of the sperm. The color of the sample was observed immediately after collection to be creamy white, indicating that the sample contained a high concentration of sperm cells. One drop of undiluted semen was placed on a warm slide and a warm cover slip carefully applied. By using a low-power magnification (x 100) a rough estimate of the number of cells in the microscopic field and the approximate degree of motility was determined.

Next, a small drop of semen was placed in a drop of warm physiological saline solution and a warm cover slip was applied. Using low-power magnification (x 100) the motility of the individual sperm cells was observed and any evidence of abnormal cell morphology was noted.

Results and Discussion

It was found that semen quality was not essentially altered in the rams by methods used in this experiment. Ram no. 4 was found to be temporarily sterile for approximately one week, but during this time the ram was scouring and appeared depressed. Sterility in this animal was not believed to be due to the action of Bayer 21/199.

Investigation of two flocks that had been sprayed with Bayer 21/199 during the summer and fall of 1958 revealed similar findings. Animals in the first flock had been sprayed once in August and again in September. On December 15, 1958, semen samples from five rams (20%) from the flock were examined and found to be essentially normal. The owner reported a normal lamb crop percentage the following spring. The second flock was sprayed on September 28, 1958. Semen specimens from 14 rams were obtained January 20, 1959, and living sperm were found in all 14 samples. Poor semen specimens were obtained from four of these rams. All four were in poor breeding condition, having suffered from screwworm infestation during the fall. The lamb crop was reported to be normal this spring.

Summary

Five rams were treated at varying intervals with 0.25% solution of Bayer 21/199. Semen collections were taken for a period of 132 days. It was concluded that Bayer 21/199 at the recommended dosage has no apparent effect on the semen quality of rams.

Feed Hygiene

A report from the Swedish State Veterinary Medical Institute indicates, among other things, that a bacteriological examination of imported animal feedstuffs disclosed isolations of *B. anthracis*, Salmonella, and Clostridia. *B. Rhusopathiae* was isolated from one domestic sample. Feed hygiene is stressed.

VG = Very Good, G = Good, F = Fair, VP = Very Poor, P = Poor
D = density
M = motility

THE EFFECT OF

HYGROMYCIN B

PUBLISHED WORK indicating anthelmintic action of antibiotics is limited. Todd,[1] and Todd and Stone[2] reported that the inclusion of penicillin, neomycin, or streptomycin in chicken feed reduced the growth rate of *Ascaridia galli* and permitted fewer worms to develop; however, doubling the concentration of penicillin did not improve the anthelmintic effect. Brown *et al.*[3] found that five day administration of chlorotetracycline, oxytetracycline, streptomycin, bacitracin, or penicillin resulted in limited ascaricidal action in cats. Habermann[4] reported that for experimental purposes puromycin hydrochloride was effective against nematodes of rodents.

A fermentation product resulting from the growth of *Streptomyces hygroscopicus*, discovered by Pittenger *et al.*,[5] was found to have anthelmintic action against nematodes of mice as tested by McCowen *et al.*[6] When tested in swine by Goldsby and Todd,[7] this fermentaion product was found to be effective against *Ascaris lumbricoides*, Oesophagostomum spp., *Trichuris suis*, and *Metastrongylus apri*. Results recorded by McCowen, Gossett, Callender, and Brandt[8] confirmed the action on three of these parasites. Metastrongylus spp. infection was not uniform; therefore, evaluation of efficacy against this species was impossible.

The purpose of this experiment was to determine the anthelmintic efficacy of two production lots of *S. hygroscopicus* crude broth culture as well as a fraction of the broth, containing hygromycin B, described by Mann and Bromer.[9] This fraction had been found, in previous unpublished experiments, to be highly active as an anthelmintic in swine. In the present work various doses were used to gain information concerning the optimum dosage for swine.

Pigs for this test weighed approximately 50 lb. each. They were purchased locally from farms where management practices had permitted parasitized animals to develop. Prior to assigning the pigs to experimental groups, fecal flotation tests were conducted to determine the number and types of parasites present. The type of parasites and relative concentration of eggs

TABLE 1. The Effect of Hygromycin B in the Feed of Swine on the Egg Counts of *Ascaris lumbricoides* in Feces and on the Worms Recovered

Pen no.	Treatment	Approximate Number of Eggs* per Gram of Feces on the Days Counted							Worms Recovered	
		0	5	7**	21	27	33	39	From Feces	From GI Tract
1	Controls	3550	8150	5500	4700	5200	2500	8600	2	78
				As Refined Hygromycin B						
2	80,000,000 u/ton of feed	6600	2550	10550	400	1150	0	0	—	0
3	40,000,000 u/ton of feed	2150	3450	2650	250	150	100	0	—	0
4	20,000,000 u/ton of feed	1300	1250	2650	950	700	100	0	1	0
5	10,000,000 u/ton of feed	6550	7100	10400	2050	1150	300	200	—	2
				As Heat Dried Culture of *S. hygroscopicus*						
6	14,600,000 u/ton	5800	4450	2050	450	50	0	0	—	0
7	8,270,000 u/ton	550	8650	5400	150	250	50	50	5	1

*The recorded number is an average of the individual counts in the groups for that day.
**Treatment started.

B ON INTESTINAL HELMINTHS IN SWINE

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were used as criteria for allotting the pigs into seven similar groups of six pigs each. Since Stohl[10] counting procedures are quite time consuming and the immediate objective was to determine the relative degree of parasitism between the individual pigs rather than the exact number of eggs per gram of feces, a simplified rapid counting procedure was devised.

The fecal flotation technic used is described as follows: Individual fecal samples were mixed with sufficient tap water to obtain a fluid consistency that would permit straining through surgical gauze; 12 ml. of saturated sucrose solution was added to 2 ml. of the filtrate in tapered polyethylene tubes (15 ml. size), and the suspension was centrifuged in a clinical centrifuge at 2,000 rpm's for three minutes. Two standard wire loops, 5 mm. in diameter, of material were removed from the surface of the liquid within the tube and placed under a cover slip (22 mm. sq.) for microscopic examination using 100 x magnification. Eggs present in

TABLE 2. The Effect of Hygromycin B in Swine Feed on on the Egg Counts of *Trichuris suis* in Feces and on the Worms Recovered

Pen no.	Treatment	Approximate Number of Eggs* per Gram of Feces on the Days Counted							Worms Recovered	
		0	5	7**	21	27	33	39	From Feces	From GI Tract
1	Controls	500	200	300	400	950	600	800	3	766
				As Refined Hygromycin B						
2	80,000,000 u/ton of feed	500	500	350	50	50	0	0	—	0
3	40,000,000 u/ton of feed	700	1000	200	250	200	50	50	—	0
4	20,000,000 u/ton of feed	300	500	400	150	200	50	0	5	17
5	10,000,000 u/ton of feed	600	600	250	250	450	150	100	—	4
				As Heat Dried Culture of *S. hygroscopicus*						
6	14,600,000 u/ton	350	850	400	200	50	0	0	—	30
7	8,270,000 u/ton	100	1150	300	50	50	50	50	8	162

*The recorded number is an average of the individual counts in the groups for that day.
**Treatment started.

ten fields were identified and counted. Later this technic was compared with a weight, volume dilution technic to determine the number of eggs per gram of feces. In these comparisons it was found the number of eggs per ten fields multiplied by a factor of 50 gave the approximate number of eggs per gram.

Groups were placed in pens with wooden block floors and self fed a complete (14% protein) swine growing ration containing various concentrations of the anthelmintic being tested (see table no. 4).

The ration consisted of the following:

Ground yellow corn	1,320 lb.
Ground oats	200 lb.
Alfalfa meal	50 lb.
Soybean oil meal	250 lb.
Meat scrap	50 lb.
Molasses	40 lb.
Animal fat	40 lb.
Dicalcium phosphate	30 lb.
Sodium chloride	10 lb.
Trace minerals	1 lb.
Vitamin premix	10 lb.
Total	2,001 lb.

Three pens, no. 1, 4, and 7, were subjected to critical test procedures discussed by Enzie, Colglazier, and Wilkens.[11] The feces from these pens were collected daily and screened over a 20 mesh screen to recover worms passed. At the end of the experiment the intestinal tracts from all the pigs in all the pens were opened and the remaining worms were counted.

The pigs from pens no. 1, 2, and 7 were slaughtered immediately at the end of the test. Liver, fat, lean meat, and kidney from each of these pigs were assayed microbiologically for antibiotic residue.

Results and Discussion

Egg counts and the number of worms recovered from the feces as well as the number of worms in the intestine at the time of slaughter are recorded for *A. lumbricoides* (table no. 1), *T. suis* (table no. 2), and Oesophagostomum spp. (table no. 3). The feeding of hygromycin B at all concentrations for a period of 35 days gave anthelmintic effect against the three worms (*A. lumbricoides*, Oesophagostomum spp., and *T. suis*) as evidenced by reduction of egg counts, passage of *A. lumbricoides* during the test, and worm counts made at slaughter. Metastrongylus spp. infections were not uniformly distributed in the various groups; therefore, no effect on this parasite was measurable.

Table no. 4 contains weight gains, feed consumption, and feed conversion data. Since the pigs were allotted on the basis of egg counts rather than starting weight, these data must be interpreted with caution; however, no deleterious effects from any of the treatments were observed during the experiment.

TABLE 3. The Effect of Hygromycin B in Swine Feed on the Egg Counts of Oesophagostomum spp. in Feces and on the Worms Recovered

Pen no.	Treatment	Approximate Number of Eggs* per Gram of Feces on the Days Counted 0	5	7**	21	27	33	39	Worms Recovered From Feces	From GI Tract
1	Controls	412	384	125	150	25	75	50	0	38
				As Refined Hygromycin B						
2	80,000,000 u/ton of feed	210	200	0	0	0	0	0	—	0
3	40,000,000 u/ton of feed	662	317	20	0	0	0	0	—	0
4	20,000,000 u/ton of feed	20	175	75	8	0	0	0	0	1
5	10,000,000 u/ton of feed	350	33	0	33	0	20	0	—	0
				As Heat Dried Culture of *S. hygroscopicus*						
6	14,600,000 u/ton	75	125	50	0	0	0	0	—	1
7	8,270,000 u/ton	216	50	25	0	0	0	0	0	1

*The recorded number is an average of the individual counts in the groups for that day.
**Treatment started.

Pigs fed the control ration, 8.27 million units of hygromycin B, or 80 million units of hygromycin B were slaughtered within 24 hours of the termination of medication. Liver, lean meat, and kidney were assayed for hygromycin B activity and none was present.

Worms recovered from pens of pigs that received 8.27 million or 80 million units of hygromycin B per ton of feed were in varying stages of decomposition. It appears from this test that the critical test procedure does not give an accurate measure of hygromycin B activity. The number of worms recovered from the feces and from intestinal tracts of the treated animals was less than those found in the controls; therefore, it is suggested that some of the parasites were digested beyond recognition before passage.

Summary

1. Hygromycin B was an effective anthelmintic for swine when fed in a complete ration for five weeks. Concentrations of 10, 20, 40, or 80 million units per ton of feed were active against *Ascaris lumbricoides*, Oesophagostomum spp., and *Trichuris suis*.

2. No undesirable side effects of the drug treatments were observed. No hygromycin B residues were detectable in the liver, lean meat, or kidney from pigs fed 8.27 million units or 80 million units of hygromycin B per ton of complete feed.

The writers wish to thank M. E. Callender, M. C. Brandt, C. E. Jackson, M. L. Jackley, and R. C. Parker for their assistance in conducting this experiment and Dr. C. Leben and Miss J. Jackley for their assistance in the preparation of the manuscript.

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TABLE 4. The Average Weight Gain, Feed Consumption, and Feed Conversion by Groups of Pigs Fed Various Concentrations of Hygromycin B

Pen no.	Treatment	Ave. Starting Wt.	Ave. Gain	Feed Consumed	Feed Conversion**
1	Controls	54.3	41.6	760	3.04
			As Refined Hygromycin B		
2	80,000,000 u/ton of feed	55.0	46.8	767	2.73
3	40,000,000 u/ton of feed	49.5	51.6	806	2.62
4	20,000,000 u/ton of feed	54.8	45.6	790	2.88
5	10,000,000 u/ton of feed	60.3	32.0	641	3.34
			As Heat Dried Culture of *S. hygroscopicus*		
6	14,600,000 u/ton	55.5	59.8	1009	2.81
7	8,270,000 u/ton	58.6	65.8	1020	3.10

*35 days — 6 pigs per pen.
**Pounds of feed consumed per pound of gain.

DISEASES OF BABY PIGS

Continued from page 48

RESPIRATORY DISEASES

The first disease condition under the broad outline, diseases manifest by respiratory involvement, is atrophic rhinitis.

Atrophic Rhinitis

Cause. The exact cause is unknown. Infective agents that have been suggested as possible causes or predisposing causes include *Trichomonads,* several species of bacteria, and viruses.

Age Incidence. Initial signs of the infection may be recognized as early as the first week of life, although visible signs usually are not noted until two to four weeks of age. The disease affects swine of all ages and possibly its most serious effects are noted in young shoat aged animals.

Signs of the Disease. The disease may be present in a drove of swine, or in an individual hog, with no visible signs of pathology indicative of its presence. Atrophic rhinitis usually follows the introduction of carrier breeding stock into a herd. Following its introduction, the disease follows the same course in most herds. During the first year there is some sneezing in pigs, and few other signs. The second year, the sneezing becomes pronounced and more pigs are involved. Some facial distortion and nasal hemorrhages are noted.

The peak of infection is reached the third year. The first signs noted are sneezing and sniffling which may be almost continuous. The pigs rub their noses on the ground and use their hind feet to scratch their noses. The signs become more severe as they grow older. A nasal discharge develops. The nasal exudate varies from clear to a yellowish, muco-purulent discharge. It may be discharged as a dry inpissated pus. The discharge is sometimes blood tinged, and in severe cases, mild to profuse nasal hemorrhage occurs. The sneezing, sniffling and nasal hemorrhage increase with exercise. Moisture from tears collects dust and debris which form a crescent shaped, black area just below the eye. This is felt to be of diagnostic significance.

At three to eight weeks of age, the skin on the snout begins to wrinkle. The snout also begins to bulge and thicken. Between six and 16 weeks, a marked distortion of the snout is noticeable. The distortion causes the nose to twist to one side, or it may result in a shortening of the nose. This shortening of the nose results in a dished face similar to that of a Berkshire. *All sneezing pigs do not develop turbinate atrophy.* Nose bleeding in adult swine is always suspicious, even though no nasal distortion is present.

Pneumonia can develop concurrently with the infection and sporadic cases of encephalitis occur. Herds affected with turbinate atrophy are frequently unthrifty. It has been suggested that a five % reduction in growth rate occurs. The mortality rate is usually low.

Varying degrees of atrophy are present in the turbinates at necropsy. Several cross sections of the snout must be made since the involvement can be so slight as to be overlooked. The posterior part of the nasal cavity may be filled with blood stained muco-purulent material. The nasal septum that divides the turbinates is often distorted to one side and the softer structures of the turbinates have almost completely disappeared. Varying degrees of pneumonia are found in the lungs.

Diagnosis. A diagnosis may be reasonably made from the history, signs, and findings on necropsy. It must be differentiated from bull nose or necrotic rhinitis caused by *Actinomyces necrophorus.* Bull nose produces abscess formation in the softer tissues surrounding the harder tissues of the air passage, not turbinate atrophy as seen in atrophic rhinitis.

Treatment. There is no effective treatment known for this condition. Secondary complications should be treated symptomatically.

Prevention and Control. Continual culling of animals showing any evidence of infection will aid materially in reducing the incidence of the disease. This

method can not be expected to eliminate the infection from a herd. A more effective method would be a program similar to that suggested for the control of virus pig pneumonia. This method consists of farrowing sows in complete isolation. Each sow and her offspring are reared in complete isolation until pigs reach weaning age. Sows and litters showing signs of rhinitis are marked for disposal. Replacement stock is selected only from those litters not showing any infection. This replacement stock is kept completely isolated and forms the nucleus for a clean herd. Some practitioners report it is reasonably safe to restock an area previously infected, if it has been kept free of swine for about 3 months.

Toxoplasmosis

Cause. A protozoan parasite, *Toxoplasma gondii,* is the cause of toxoplasmosis.

Predisposing Causes. At present, predisposing causes are not known.

Age Incidence. This condition occurs from premature birth to three weeks of age.

Signs of Infection. Asymptomatic sows farrow weak, premature, or stillborn pigs. When young pigs are affected, they show signs of respiratory involvement such as coughing and dyspnea. Temperature is elevated from 104 to 107 F., and they shiver and tremble. Weakness and incoordination are evident and a diarrhea may develop.

Focal necrosis of the liver, hydrothorax, ascites, lymphadenitis, an enteritis that may be ulcerative, is sometimes evident at necropsy.

Diagnosis. Based on histological study with demonstration of the toxoplasma in affected tisues, animal inoculation and the Sabin-Feldman dye test or complement-fixation tests with an ascending titer. The disease must be differentiated from brucellosis, pneumonia, and enteric diseases.

Treatment, Prevention, and Control. As yet, little is known about the exact method of transmission, and treatment has only been tried experimentally.

Virus Pig Pneumonia

Cause. The cause of this disease is a virus.

Age Incidence. Any age susceptible, however, pigs between three and ten weeks usually show first signs of the disease. When the disease is newly introduced into a herd, the older hogs may be the more severely affected. After the disease has become established in a herd, then the young fattening animals may be the more severely affected. Pigs which have contacted the disease early in life may suffer a secondary breakdown and develop an acute pneumonia at 10 to 26 weeks of age. Breeding stock running out of doors seldom shows symptoms.

Predisposing Causes. Overcrowding is the chief predisposing cause.

Method of Spread and Incubation. The disease is spread by direct contact, or by inhalation of the air-borne virus. Some animals are asymptomatic carriers. Young pigs usually contact the disease from the dam. Young pigs that have contacted the disease from their dam, spread it by contact to uninfected pigs. The incubation period is usually two to three weeks.

Signs of the Infection. The onset is insidious. The most outstanding sign is a dry, non-productive cough. The cough may continue for the life of the pig, or disappear after a few weeks. The pigs lose "bloom" and become stunted due to the pulmonary involvement. The gains in body weight and stature are uneven, some being more severely affected than others.

If the disease is contracted early in life, then pigs may develop a severe pneumonia, termed a "secondary breakdown" at 19 to 26 weeks of age. The pneumonia comes on quite suddenly. There is an extension, at this time, of preexisting virus lesions and a rapid multiplication of secondary invaders. Pigs thus affected lose their appetite, have a rise in temperature and sometimes become prostrate. A few pigs may die, but the majority recover in one or two weeks. However, there is a reduction in growth and a severe weight loss. The mortality

rate from this condition is low, the most severe economic losses being from a failure to gain weight. In summary, the only signs of this condition seen in baby pigs are usually a cough, and uneven gains in a litter. Recovered animals remain carriers.

The ventral portions or tips of the cardiac and apical lobes (antero-dependent portions of the lobes) in close proximity to the heart are typically involved. These areas have pneumonic lesions that are usually plum colored, but may be gray. The pneumonic areas are separated from normal tissue by a clear-cut and slightly depressed line of demarcation. A band of congestion may precede the line of demarcation as the disease progresses. The bronchial and mediastinal lymph glands are enlarged and edematous. In secondary breakdowns, there is often a serofibrinous pleuritis, and pericarditis, and even peritonitis. Pleurisy and pericarditis may occur independent of the so-called secondary breakdown. In acute cases in young pigs there may be intense pulmonary congestion and edema with much froth in the trachea. In sucklings the only lesion may be extensively swollen mediastinal lymph glands.

Diagnosis. A reasonably accurate diagnosis can be made based on history, signs of the infection, and especially necropsy findings of the plum colored lesions with the sharp line of demarcation in the cardiac and apical lobes of the lungs. Histological studies may be necessary to confirm the diagnosis. The disease might be confused with Glasser's disease.

Treatment. Treatment is purely symptomatic. Improvement has been reported from the use of any one of the following: sulfamethazine, penicillin, Aureomycin, Terramycin or Chloromycetin. No cure has been claimed. A suggested treatment for young pigs is Chloromycetin by intramuscular injections of 25/35 mg./kg. daily for three days or in severe cases two times a day. It has been reported good in acute cases, less so in chronic cases. Its use may prevent stunting.

Prevention and Control. If the disease does not exist on premises, prevention lies in obtaining replacement stock only from known disease free herds, and preventing the subsequent exposure of any animals to contact with infected animals. Once the disease becomes established on a premise, the following methods may be tried in an attempt to rid the farm of the disease.

1. Farrow each sow completely isolated from other swine.
2. Raise the sow and litter in complete isolation to weaning age. Check each litter for any signs of coughing or stunting. Examine one or more pigs by clinical examination and necropsy to determine the presence or absence of the infection.
3. Group the litters judged to be free of the disease for use as replacement stock.
4. Dispose of parent stock that have passed the infection on to their offspring, and raise the offspring thus infected to market age, and dispose of it.
5. As a further check on the group of pigs felt to be free of the disease, examine some of them at slaughter when they have reached market age.
6. Replace the original breeding stock as soon as possible with the known disease free stock.
7. Clean and disinfect all farrowing pens and allow all areas occupied by diseased stock to lie fallow for several weeks.

Other Diseases Causing Respiratory Involvement

Almost any disease may cause an increased respiratory rate and give the appearance of a respiratory involvement. Pneumonia frequently develops in the terminal stages of any disease. Anemia and Glasser's disease often have a pronounced respiratory involvement with pneumonia. Respiratory involvement is often noted in bacterial infections such as Streptococci, Salmonellosis, Erysipelas, and Corynebacteria and in viral infections such as hog cholera and Aujesky's disease. Respiratory distress also occurs in eperythrozoonosis, edema disease and influenza. Migrating larvae of *Ascaris lumbricoides* produce a distinct respira

tory syndrome. Signs of this condition include a soft, moist cough, thumping, and unthriftiness. There is a low mortality but a high morbidity. Necropsy of affected pigs reveals ecchymotic or blotchy hemorrhages in the lungs, often termed "crepe paper" lungs. Milk spots or fibrotic areas and small hemorrhages may be found in the liver. This condition can be confused with virus pig pneumonia, but a necropsy reveals the difference.

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ORAL STEROID THERAPY IN DAIRY CATTLE

R. R. BILLER, D.V.M.

Mosinee, Wisconsin

OVER THE PAST TEN YEARS there have been many improvements in the corticosteroids and an accumulation of knowledge as to their use. Yet with all the improvements, one area was neglected—a cortiscosteroid which could be administered orally to the ruminant at dosages equivalent to those employed parenterally with the same therapeutic benefit. Results could be obtained by the oral route, but only with dosages four to five times greater than those employed in parenteral administration with the result that it was economically unfeasible.

Recently an opportunity was presented to clinically evaluate a new corticosteroid (Azium — Schering), which is the 9-alpha-fluoro, 16-alpha-methyl analogue of prednisolone. The material used was in the form of a scored bolus which contained 5 mg. of Azium. The investigation was conducted in dairy cattle and involved 65 cases. Conditions treated included such things as ketosis, various types of toxemias, acute mastitis, arthritis, foot rot, retained placenta, dystocia, shock and other stress situations.

It has been observed in this practice that each succeeding year a greater number of relapses occur in the treatment of ketosis. This is, no doubt, due to a number of factors, including increasing milk production, closer inbreeding and state of nutrition. A partial answer to the problem of relapsing ketosis cases seems to be to provide sustained and prolonged therapy. Intravenous sugar is of limited value since the rapid rise in blood sugar after administration is followed by an equally rapid drop, and the whole effect is gone in a matter of hours. Parenteral

TABLE 1. Ketosis

Breed	Weight	Initial Azium Inj. (mg.)	Bolus Administered 0 hr.	24 hr.	48 hr.	72 hr.	96 hr.	Comments
Guernsey	1,000	5			1			Good recovery
Guernsey	950	5		1				Good recovery
Guernsey	1,000	0	1		1			Good recovery
Holstein	1,200	5		2	2			Good recovery
Holstein	1,250	5		1	1	1		Good recovery
Guernsey	1,050	0	1	1	1			Good recovery
Holstein	1,100	0	2	1	1	1		Good recovery
Holstein	1,300	0	2	1	1	1		Good recovery
Guernsey	1,000	0	2					Animal relapsed on
			2	1	1	1		day 7; good recovery
Holstein	1,300	5		1	1	1		Animal relapsed on
		10		1	1	1		day 11; good recovey
Holstein	1,250	5		1	1			Good recovery
Holstein	1,300	5			2	1	1	Good recovery
Holstein	1,200	10		1	1			Good recovery
Guernsey	1,000	5		1		1	1	Good recovery
Guernsey	1,000	5		1	1			Good recovery
Guernsey	1,050	5		1		1		Good recovery
Guernsey	1,050	5		1	1			Good recovery
Holstein	1,200	5		1	1			Good recovery
Guernsey	1,000	5		1	1			Animal relapsed on
		0	2	1				day 9; good recovery
Holstein	1,250	5		1		1		Good recovery
Holstein	1,300	5			1	1		Good recovery
Guernsey	950	5			1		1	Good recovery
Holstein	1,100	5			1		1	Good recovery

TABLE 2. Supportive Therapy

Condition	No. of Cases
Toxic and Acute Mastitis	8
Arthritis	5
Dystocia	6
Shock	4
Toxemia	4
Paralysis	3
Foot Rot	3
Downer Cow	3
Udder Edema	2
Severe Lacerations	2
Nephritis	2
Pneumonia	1
Traumatic Gastritis	1

administration of a corticosteroid causes a much more prolonged blood sugar elevation, but in approximately 48 hours levels are down. The corticosteroid bolus, however, provides a convenient means for maintaining prolonged steroid therapy, either alone or in conjunction with an injectable steroid, thus minimizing the necessity of repeat calls.

Table 1 shows the 23 cases of ketosis treated in this study. Of the 23 cases treated, only three relapsed and these were successfully retreated. The results in table 1 point out the advantages of maintaining prolonged steroid therapy by dispensing boluses to be administered after the initial injection. The cases ranged in severity and duration and this determined the number of boluses used. From the experience gained so far, it would appear that most cases of ketosis can be treated successfully with an initial 5 mg. injection of Azium, followed by two boluses administered at 24 and 48 hours.

In addition to ketosis, a number of other conditions were treated with the boluses which are listed in table 2. In most instances the steroid was employed as supportive therapy in combination with other medication. The steroid was administered in bolus form in practically all cases. The only exception was in acute conditions where more rapid onset of activity was desired. In such instances, the injection was followed by oral boluses.

Table 3 shows in detail one of the indications treated.

Discussion

Azium boluses proved to be of benefit in this practice. In clinical cases where the bolus was dispensed for follow up treatment, steroid therapy could be maintained for a number of days. Such therapy proved extremely useful in treating difficult ketosis cases and the percentage of repeat calls was kept at a minimum. When used as supportive therapy, results were good. Animals began eating sooner and full production was attained in shorter periods of time. The bolus represents a convenient and economical means of obtaining effective corticosteroid therapy.

TABLE 3. Toxic and Acute Mastitis

Breed	Weight	Initial Azium Inj. (mg.)	Bolus Administered 0 hr.	24 hr.	48 hr.	72 hr.	96 hr.	Other Treatment	Comments
Holstein	1,100	0	1	1				Antibiotics	Good recovery
Holstein	1,200	0	1	1				Antibiotics	Good recovery
Holstein	1,300	0	2	1				Antibiotics	Good recovery
Guernsey*	1,050	10		1	1			Antibiotics	Good recovery
Holstein	1,150	0	1	1	1			Antibiotics	Good recovery
Holstein*	1,200	10	1	1	1	1		Antibiotics	Mastitis cured in 3 days — cow unable to stand by 10 days — rendering plant.
Guernsey	985	0	1		1			Antibiotics	Good recovery
Holstein	1,275	0	1		1			Antibiotics	Good recovery

*Toxic—cow down.

Books reviewed in this department and any other books, if available, may be obtained by remitting published price to the publisher.

Practitioner's Bookshelf

THE TRUTH ABOUT DOGS, by *Leon F. Whitney, D.V.M.*; 184 pages, illustrated. Thomas Nelson & Sons, 19 East 47th Street, New York 17, New York, Publisher, 1959. Price—$3.50

Here is an item that is good for the waiting room of any veterinary clinic, and valuable as an entry on the practitioner's bookshelf as well. Doctor Whitney tells how the dog is, after all, a human invention —derived from the wolf by man through human ingenuity in selective breeding and controlled mutations.

It is only in comparatively recent times that most breeds have been brought to the perfection of usefulness and beauty. Fine standards were established and superb dogs were the result. It is disheartening today to realize what dishonesty, fashion, and—most important—wrong breed standards have done to dogs in recent years, Doctor Whitney states.

Whitney discusses with complete frankness the roles of dog breeders, pet-shop owners, kennel clubs, humane societies, dog shows, field trials and other institutions in making dogs what they are today, and he has much to say about the faults and duties of the individual dog owner. The message here is that if all of us concerned with dogs—individuals and societies alike— will honestly face the faults that prevail today, it should be possible to establish first-class lines in all the breeds within a few canine generations.

REPRODUCTION AND INFERTILITY, III SYMPOSIUM, edited by *F. X. Gassner;* 273 pages, illustrated. Pergamon Press, Inc., 122 East 55th Street, New York 22, New York, Publisher, 1959. Price—$6.50

The creation of a biennial Symposium on Reproduction and Infertility was the result of widespread demands by investigators and specialists active in the animal and human fields.

Unquestionably, there is an urgent need for a greater opportunity to hold fruitful discourse on the many complex problems confronting the research worker in the study of reproduction, infertility and disease, and for offering a means of effectively emphasizing the cosmopolitan and limitless nature of the problems attending reproduction.

This volume represents the proceedings of The Third Symposium on Reproduction and Infertility at Colorado State University, Fort Collins, Colorado; the papers published show clearly those topics in which advance has been rapid in recent years, and they cover the most important facets of the problems encountered in reproduction and infertility. Each author is given generous latitude in organizing and defending his views in his own field of specialization, as this serves to stimulate and guide research towards the crystallization of theories and the establishment of knowledge.

More published material on this subject will probably follow.

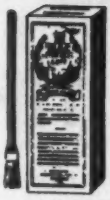
Davis Promoted at Jen-Sal

Appointment of Dr. James C. Davis as Assistant General Manager and Vice-President of Jensen-Salsbery Laboratories, Inc., a subsidiary of Vick Chemical Company, was recently announced.

Dr. Jim Davis

In his new position at Jen-Sal, Doctor Davis will have the responsibility of all sales and promotional activities as well as directing professional services and the executive development program. He will also serve on the board of directors. For the past ten years, Doctor Davis has successfully and successively filled a series of positions at Jen-Sal up to that of General Sales Manager. He is a graduate veterinarian, having earned his DVM degree at Kansas State University in 1949.

M·A·C



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MINORITY REPORT

Take Time to Live

This month MINORITY REPORT *covers a facet of practice that touches everyone who has ever taken a degree in veterinary medicine. Further development of this idea can be noted on page 88 of this issue.*

In a lecture to a group of medical students some time ago, Sir William Osler gave this profound bit of advice.

"Engrossed late and soon in professional care, getting and spending, you may lay waste your power that you find too late, with heart given away, that there is no place in your habit stricken soul for those gentler influences which will make your life worth living."

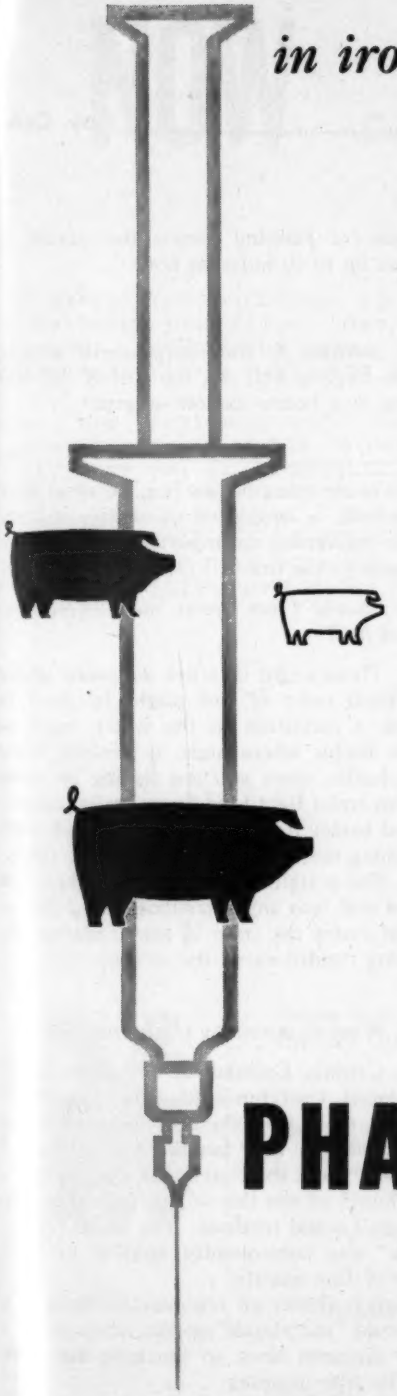
The practicing veterinarian who faces a hard seven day week in a small animal hospital or general practice needs the benefits of a little recreation more than the 40 hour week clerk or the mill worker. Yet he seldom takes time to rejuvenate himself physically, emotionally and mentally. Frequently his habit stricken soul finds him looking back to yesteryear, to better days when life was full and vibrant. The "good old days" we call them, be they the roaring 20's, the depression ridden 30's, the war-time 40's, or the closed decade of the 50's. Yet a more mature sense of values tells us that none of these decades were superior to the era in which we now live. The "good old days" are in fact the days when we were young and acted the part, when we lived each day and stopped each day to take time to live.

The march of veterinary practice through the years has brought great changes to the life of the average practitioner. During long years in school, during weary hours of practice after graduation, the young veterinarian becomes used to the idea of work—work and more work—until at last he comes to think of his work as his reason for being. This is, of course, as it should be.

To be sure, the life of a practitioner is not an easy one. It takes energy—and lots of it—to drive to a worthy fruition the labors of learning that became habit in college. But the gentler influences of living are—after all—still holding their own in the scheme of things.

If there is one consuming problem facing the practitioner today it is this: he all too frequently refuses to make place in his busy life for a little "living" as he goes along. Seasoned practitioners are quick to point out to their younger colleagues the importance of living a little as they go through their practice career. With a little effort, everyone in the veterinary profession can take to heart this minority report, and make the golden decade of the 60's as good or better than the "good old days," regardless of when those good old days passed by.

In this and future issues of VETERINARY MEDICINE, a feature identified by the title, Take Time to Live, will review interesting hobbies of veterinarians, sports, hunting, fishing, guns, and other subjects of general interest. Practitioners who have a special hobby or avocation that other veterinarians would enjoy hearing about, should take time to drop VM a note.—*Charles Walters, Jr.*



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Take time to live

by Coop

One of the most noble and hunt-worthy specimens of big game is the elk.

Unlike the deer, the elk has not been able to adjust itself to advancing civilization. Elk have found that the best place for them is away from hunters' guns, in high, isolated country.

For the most part, they are above the foothills, in the "elk belt" just below timberline. If the winter is mild, they stay in the highest of the high country. When the winds of winter kick up a fuss, they drive the elk down to lower slopes and the hunter has a better chance of meeting up with one of these majestic critters.

About the name *elk:* in Europe the elk is called *moose.* The nearest relative of our so-called elk is the red deer of Europe. Quite a few years back, the Indian name of "wapita" was substituted, but elk is so well established that it will stick.

Elk take to heavy forest-cover during the daylight hours, especially during the hunting season when the guns are a-booming. A good trick is to get to some high lookout point at the crack of dawn. You may be lucky enough to observe a herd moving into the forest thickets for the day. Then you can soft-foot it through the woods a-stalking the wary critter; you stop, pick up a sign, listen a spell (elk make a racket when they move), soft-foot some more, listen and so on.

Stalking must be done with least possible noise. They seem to have a keener awareness than deer. If they are spooked, they really move out—not like a deer, which may circle around, not leaving the immediate area. Elk, when alarmed, leave the country — not hundreds of yards, but miles.

•

Did you know that bison, for all their great bulk, are speedy runners? An adult may weigh half a ton or more, but may be capable of running across the plains at speeds up to 40 miles an hour.

•

In contrast to the sharp, shrill whistle of the bugling bull elk, the call of the bull moose is a hoarse bellow or grunt.

•

We're throwing on the fire, for what they are worth, a couple of questions and answers concerning an important item of fishing gear — the line:

Q. Should I use green, mist, or camouflaged line?

A. There might be a few occasions where a certain color of line might be used to match a condition in the water, such as green leader where algae is present, light blue leader when you are fishing an open stream and a light blue sky prevails, camouflaged leader if fishing a brushy creek with matching overhanging foliage. Many fishermen like a light colorless leader that will blend well into any surrounding and do not try to match the color of any leader to the varying conditions of the stream.

Q. What is meant by Cuttyhunk line?

A. Captain Crandall of Ashaway, R. I., developed Cuttyhunk line. It was hand-twisted, made from the best imported linens obtainable. A very famous fishing club of the early days, the Cuttyhunk Fishing Club, purchased all the line of this type that Cap Crandall could produce. The name "cuttyhunk" was consequently applied to linen lines of fine quality.

Today, almost all line manufacturers use the word "cuttyhunk" on the labels of even their cheapest lines, so the term has since lost its true meaning.

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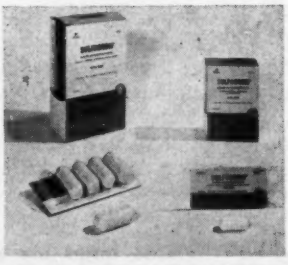
Reader's Service

The first **Oral Corticosteroid** for large animal use has been introduced to the profession. The new product, Azium Bolus, is an oral form of the widely accepted new steroid, dexamethasone. The new drug is useful in inflammatory, allergic, rheumatic, dermatologic, and other conditions responsive to corticoid therapy. The bolus is also beneficial as supportive therapy in respiratory conditions, ketosis, traumatic gastritis, and various stress conditions of horses and cattle. It is produced by Schering Corporation.

Jenotone designates a new approach to treatment of hypertonic conditions of smooth muscle tissue. It acts directly on smooth muscle tissue, rather than through the autonomic nervous system. Jenotone is a phenothiazine derivative, and its spasmolytic activity being musculotropic, smooth muscle hypertonicity is controlled without side effects commonly associated with drugs of neurotropic action. Case histories and professional literature are available from Jensen-Salsbery Laboratories, Inc., Box 167, Kansas City 41, Missouri.

New brochure from Beckman/Spinco describes the **Ultramicro Analytical System** for blood analyses on drop-size samples. This publication catalogs the Spectro-Colorimeter, Microfuge, Microtitrator, and Micropaks which form the analysis system. Included is a discussion of the technics by which this equipment is used to make microliter analyses of the following types: bilirubin, calcium, chloride, total cholesterol, creatinine, glucose, phosphorus, proteins, urea nitrogen, uric acid.

Sulfabrom — in bolus and buffered powder form — will be offered at a 25% savings to professional veterinarians between February 1 and March 15, 1960. Handy, molded



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plastic packs offer ease of administration and quick inventory, as illustrated here. For details ask your Merck representative.

Pathology via Radiography is made easy with Friesch *x*-ray paper. This new product is a sheet of fine paper that emerges from the fixing solution as a positive picture that can be viewed under difficult practice situations without the use of a viewing box. Used in much the same manner as *x*-ray film, the cassette is loaded and exposure taken by approximately the same technic used with film. Developing and

fixing are accomplished with the same equipment and procedures as with conventional *x*-ray film. Friesch asserts that its *x*-ray paper provides excellent contrast, sharp reproduction of all detail, great sensitivity with a wide exposure scope, brilliant glaze and no tendency to color. For details ask Friesch Laboratories, 3906 Polly Street, Dallas 10, Texas.

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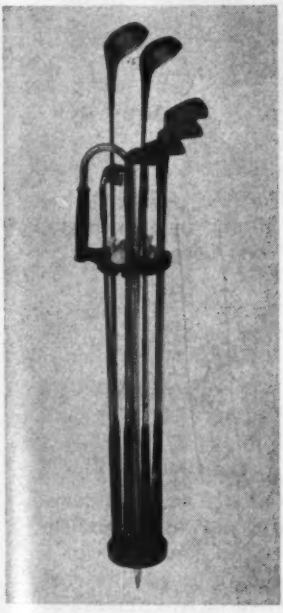

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polished aluminum tubing, holds eight clubs, three balls, tees, pencil and scorecard. It weighs just 20 ounces. Sells for $7.95. Order from Sunday Caddi, Box 4117, Cleveland 23, Ohio.

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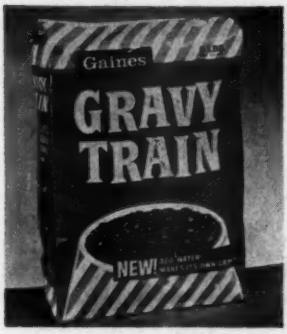

General Foods

before feeding. The new product is being marketed in a 2 lb. and in 5 lb. bags, by Gaines, General Foods Corporation.

CLINICAL USE OF SUCCINYLCHOLINE CHLORIDE IN THE HORSE

Concluded from page 42

injected intramuscularly or subcutaneously and the paralysis was incomplete for these reasons, the original dose or a slightly larger one may be administered after waiting a period of five minutes to allow complete breakdown of the original injection.

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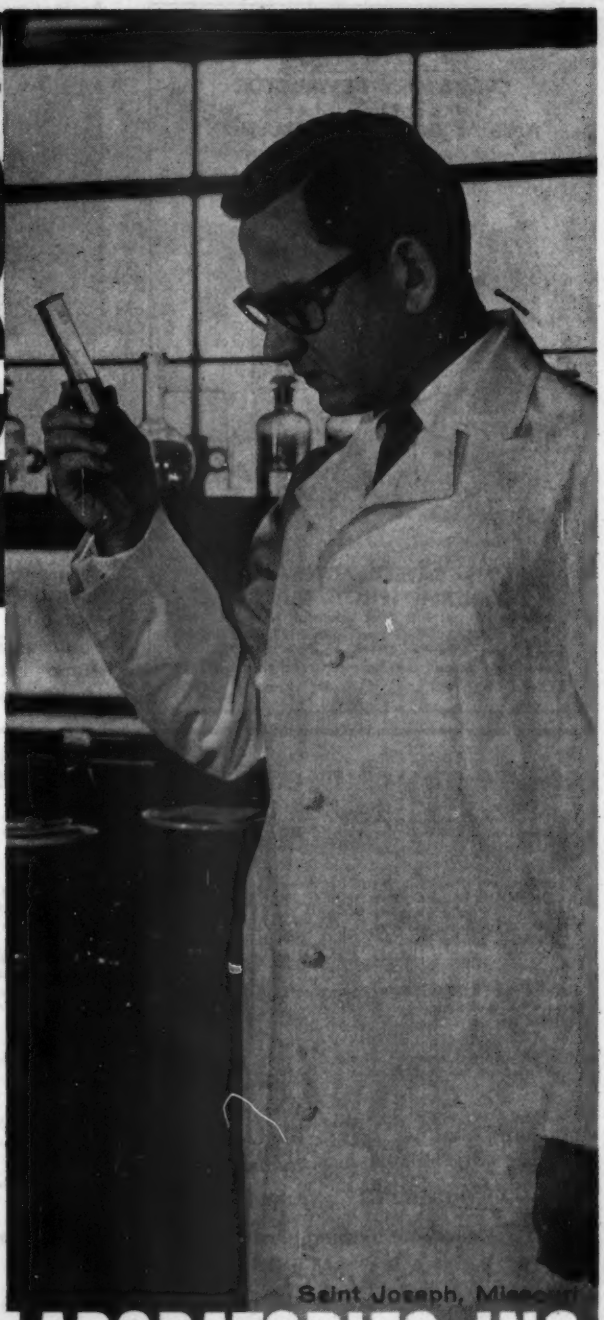

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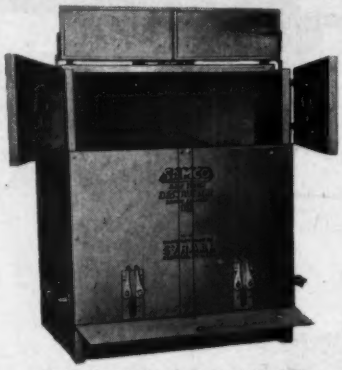

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Professors Honored

Professor Henry H. Dukes and Mrs. Dukes (center) and Prof. Joseph A. Dye and Mrs. Dye (left) speak with Donald A. Rankin, associate medical director of Squibb and Company after a dinner meeting honoring the two professors. Portraits of Professor Dukes, head of the Department of Veterinary Physiology at Cornell University, and of Professor Dye, professor of veterinary physiology at Cornell, were presented to the State Veterinary College by alumni. The two professors will retire in June—Professor Dukes after 27 years service, Professor Dye after 36.

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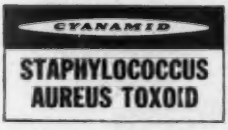

*Journal A.V.M.A. 134:155-161 (Febr. 15) 1959

Research Reveals Highly Effective Anthelmintic for Cattle

The results of recently intensive clinical research revealed an anthelmintic that is highly effective in cattle. Individual animals were confined in special stalls and administered different phenothiazine drench formulations for testing. All urinary and fecal excreta were recovered and each excretion was individually analyzed chemically to determine how much of the dose went into the digestive tract and amount of the dose available for killing worms. Dosages were given on an identical basis.

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Results obtained from the modified formulation were better than that of unmodified drenches generally used. Tests show that modified formulations made with Purified phenothiazine, micronized for maximum efficiency, produced 6 to 8 times more phenothiazine in the digestive tract in a shorter period of time than other drenches. Peak percentages of the purified chemical were obtained in 17 hours post treatment. The unmodified formulations returned a peak percentage of less than .2% 40 hours or later post treatment.

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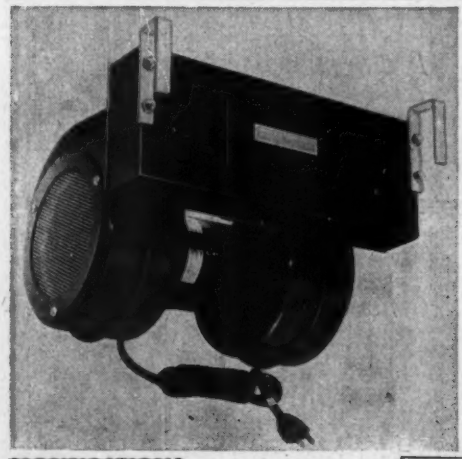
To Head Practice Group

Jordan G. Woodcock, V.M.D., supervisc of drug tests for the New York State Racin Commission, was elected president of th

American Association of Equine Practitioners at the organization's annual meeting held in Chicago December 14, 15, and 16. General Kester (left) is outgoing president.



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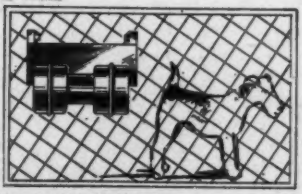

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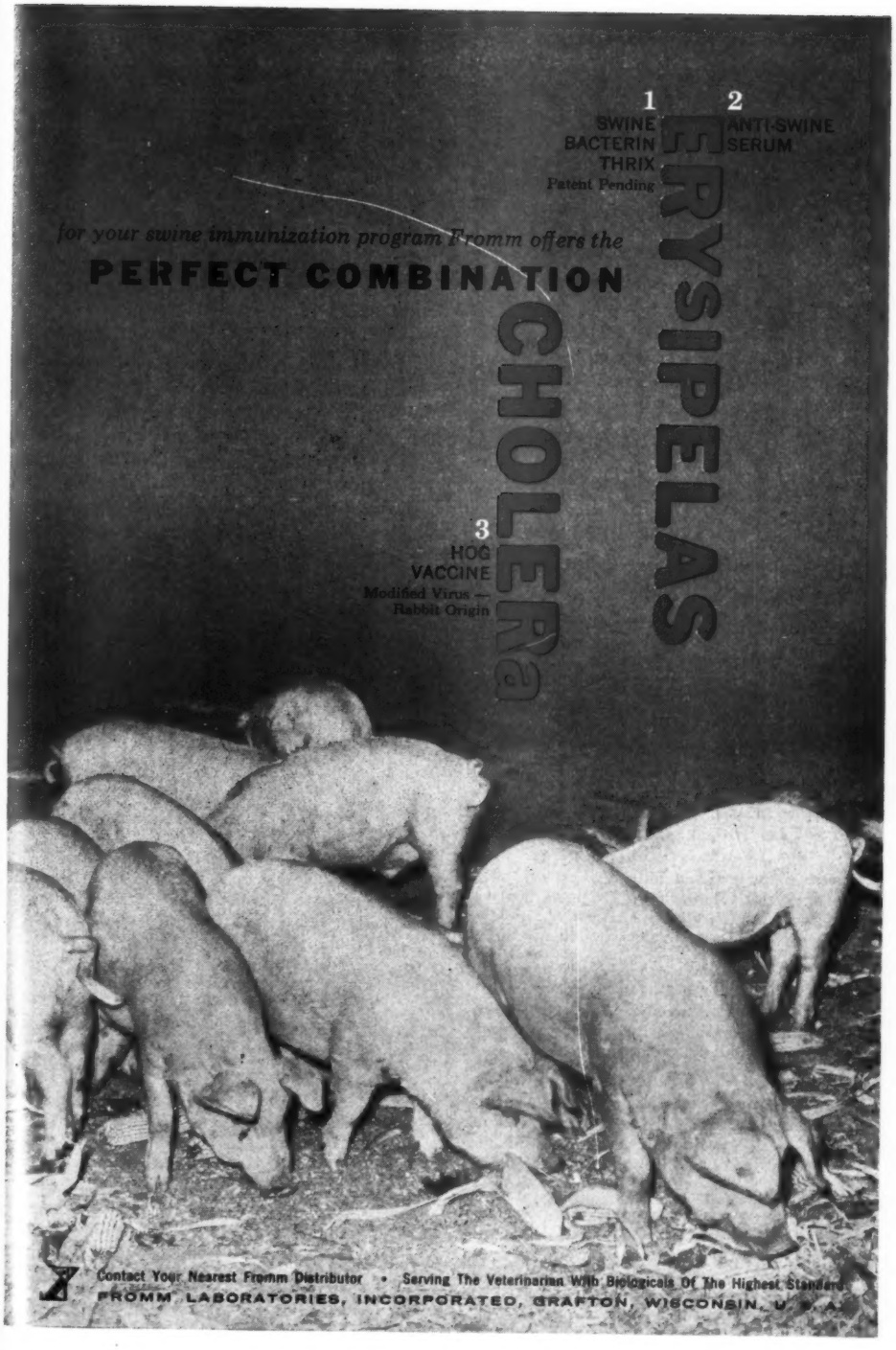
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Doctor Morse Becomes Dean at Purdue

Dr. Erskine V. Morse, associate director of the Medical Research Institute and professor of veterinary hygiene at the Iowa State University Veterinary Medical College, is the new dean of the School of Veterinary Science and Medicine at Purdue University. He succeeds the late Dean L. M. (Pat) Hutchings, who died last July following a long illness. Doctor Morse will assume his duties this spring.

A native of California, and already an outstanding leader in veterinary medicine, Doctor Morse was graduated from high school in Los Angeles and studied agriculture at the University of California at Davis in 1939-40. He obtained his DVM degree in 1944 at Cornell, following which he was in the Army Veterinary Corps as a lieutenant and captain for three years. He completed work for his master's degree in 1948 and doctor of philosophy degree in 1949. Both were at Cornell.

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To maintain unrestricted milk flow and provide medical antisepsis are of prime importance in treating teat troubles. Dr. Naylor Dilators accomplish these 2 objectives specifically with this 2-WAY ACTION:

1. MECHANICAL ACTION . . . gently supports sphincter and teat mucosa—keeps teat open and promotes easier, natural milking. Positive retention in small or large teats.

2. MEDICAL ACTION . . . *Sulfathiazole* released slowly from within the Dilator provides broad antimicrobial protection; combats infection and reduces swelling; minimizes ascending inflammation and promotes healing.

WITH ANTIBIOTICS . . . Saturated with your favorite udder infusion antibiotic, Dr. Naylor Dilators are an ideal vehicle for additional local medication following teat surgery.

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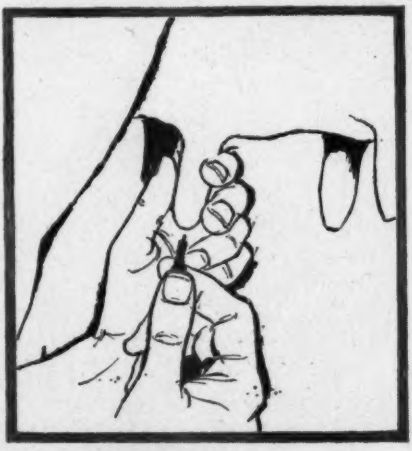


Dr. Naylor
Medicated
Teat Dilators
SUPPLIED:
Dispensing vials—16's
Labled packages—42's

a simple 2-step method with

FURACIN®

BRAND OF NITROFURAZONE

Solution Veterinary SQUEEJET® and Suppositories Veterinary

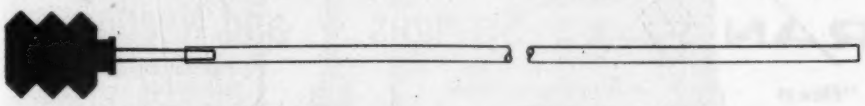
- **reduces services per conception**
- **shortens intervals between calvings**

Impaired fertility in cows, commonly accepted to result from non-specific genital infection, responds dramatically to the 2-step treatment method with FURACIN. In one 3-year study involving treatment with FURACIN Suppositories Veterinary, of approximately one-half of 530 "problem breeders": "The average number of services per conception was 1.88 in the treated and 2.85 in the untreated cows. The average number of days between calvings was 385 in the treated and 447 in the untreated animals."[1]

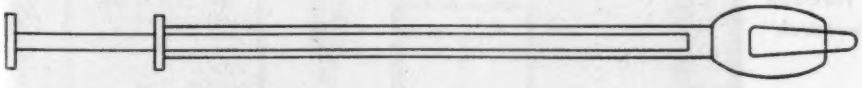
In a study with 85 subfertile dairy cows, 61.7% of 34 treated with an intra-uterine injection of FURACIN Solution Veterinary conceived at first service, while only 19.3% of 31 treated in an identical manner with 10% saline solution conceived at first service; 40% of 20 non-treated controls conceived at first service.[2]

FURACIN 2-Step Method for Impaired Fertility

STEP 1. During estrus, instill, aseptically, the contents of 1 to 3 SQUEEJETS (30 to 90 cc.) of FURACIN Solution Veterinary into the uterus by means of a uterine pipette.



STEP 2. During the following 3 weeks, insert 1 FURACIN Suppository Veterinary into the anterior portion of the vagina 3 times each week on alternate days.



The cow may then be bred during the next estrus.

Supply: FURACIN Solution Veterinary SQUEEJET (30 cc. each), boxes of 12; FURACIN Suppositories Veterinary, boxes of 12.

1. Vigue, R. F., et al.: J. Am. Vet. M. Ass. 134:308 (April 1) 1959.
2. Vigue, R. F.: Personal communication.

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Devereux Assistant Dean

Dr. Edward D. Devereux has been named assistant dean of the College of Veterinary Medicine at Michigan State University.

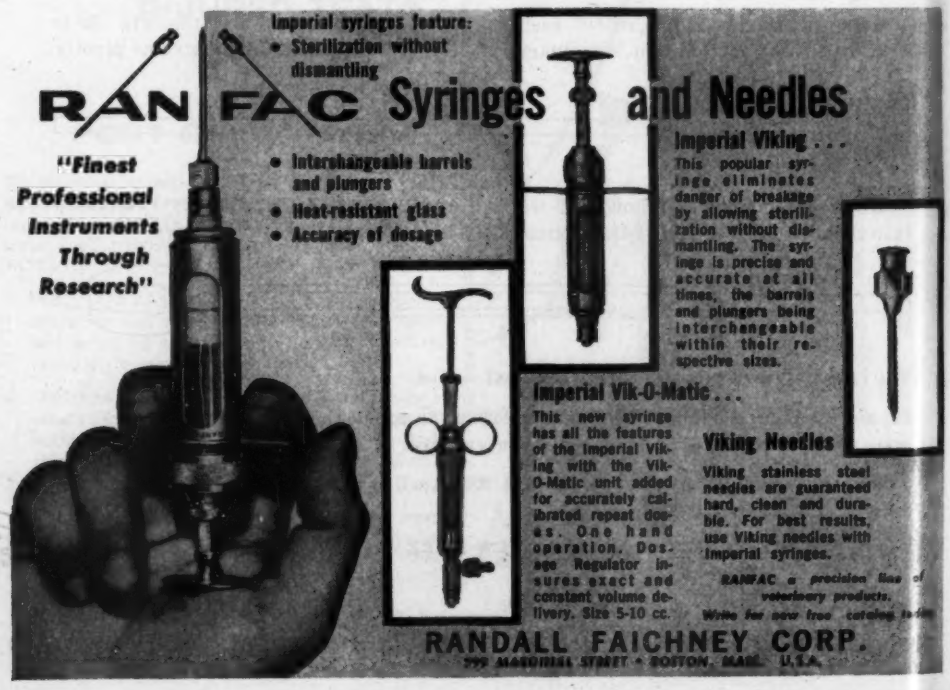
Dr. Devereux will continue as professor of microbiology and public health but will also aid Dean Willis W. Armistead, primarily in matters of on-campus education.

He has been teaching and doing research at M.S.U. since 1927 and is the author of numerous scientific publications and the co-author of "Laboratory Manual for Beginning Bacteriology."

Cat Population To Jump

During 1960, cats will solidify their position as America's most popular pet. The manufacturers of Puss 'n Boots cat food estimate that the total cat population by the end of the year will be 28 million, approximately two million more than the estimated dog population.

Twenty-four percent of American families — roughly 12 million — own one or more cats as pets.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